Assessment of Fuel Constraint Impacts on Freight Transport in New Zealand

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ABSTRACT

Abstract of a thesis submitted in partial fulfilment of the
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by Aline Eloyse Lang

Even though there is a high likelihood of future fuel constraints due to capacity limitations, there is little knowledge about the impacts on the economy and freight transport. This research used Input-Output (I-O) analysis to model the relationship between fuel constraints and economic impacts. The total reduction of financial flow imposed on the economy by peak oil was calculated through the supply constrained I-O model. The Leontief price model (LPM) was used to calculate the impacts of a fuel price increase.

Initially, the monetary relationships and the economic trade among the different sectors and regions of New Zealand were analysed through the I-O and MRIO (Multi-Regional Input-Output) models. In terms of individual industries, the 51 sectors I-O table indicates that the most significant industries were service industries: trade, construction, housing, and finance and insurance. This analysis contradicts the widely stated view that the New Zealand economy is based on tourism, primary industries and international trade. The economic trade relates to the physical trade, as the exchange of money between regions corresponds to the trade of goods and services observed in the real world. The physical trade describes the transport activities.

The outputs of the I-O and MRIO models were used to model freight transport. The literature review indicated that combined models were more suitable to this research, as they can be linked to I-O models, allowing one to perform trip generation, followed by simultaneous trip distribution and assignment. Such an approach guarantees that equilibrium is reached and the errors are minimized. This model can reproduce well the current freight transport movements among regions, and the impacts of fuel constraints can be assessed using the result of the MRIO model after the application of a fuel constraint.

While fuel constraints can happen due to many reasons (e.g. strikes, natural disasters and trade barriers), the focus of this thesis is the Peak Oil scenario, in which no excess capacity will be available. Due to its transitional nature, no immediate adjustment will likely take place within the economic system. The mixed I-O model allows for the estimation of reductions in outputs given defined constraints in selected sectors (in the case of this research, the fuel sector).

Fuel constraints were estimated in physical terms (approximately 2% reduction per annum) and financial terms (total reduction of financial flow imposed upon the economy by peak oil). The monetary constraint analysis was performed using the LPM and assuming a 100% fuel price increase. It was observed that the mixed I-O showed insensitivity to a small change in fuel availability. The LPM, on the other hand, showed higher impacts than the mixed I-O. The most affected sectors were fuel intense sectors, such as mining, fertilizers and transport related services.

Assuming that the economic trade between regions can well describe the freight transport movements, the overall impact reduction in transport flows was estimated at 0.07%. This value indicates no significant impact on trip distribution and traffic flows, so a new transport model was not necessary.

Keywords: Fuel constraints, peak oil, economic impact, Input-Output analysis, Multi-Regional Input-Output, freight transport.

DEDICATION

To God, my Lord and Saviour and to Christ who strengthens me.

To my greatest husband and my dearest boys Matheus and Davi.

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To my sweet boys, that I will always love; after having them I felt stronger, and I hope they learn all things are possible through Christ.

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List of Abbreviations and Acronyms

4SM	Four-Step Model
AADT	Average Annual Daily Traffic
Admin.	Administration
ANZSCC	Australian and New Zealand Standard Commodity Classification
ANZSIC	Australian and New Zealand Standard Industrial Classification
ANZSPC	Australian and New Zealand Standard Product Classification
BAU	Business as Usual
CAFE	Corporate Average Fuel Efficiency
CB	Commodity-based
CBA	Cost-Benefit Analysis
CEA	Cost-Effectiveness Analysis
CGE	Computable General Equilibrium
CIF	Cost of goods, including Insurance and Freight
CILQ	Cross-Industry Location Quotient
DSM	Demand-Side Management
DSS	Decision Support System
DTA	Dynamic Traffic Assignment
ECan	Environmental Canterbury
EECA	Energy Efficiency and Conservation Authority
EEM1	Economic Evaluation Manual – Volume 1
EIA	Energy Information Administration
EROI	Energy Return on Investment
FOB	Free On Board
FTE	Full Time Employee
FTM	Freight Transport Model
FTS	Freight Transport System
Gb	Gigabarrel or one thousand million barrels
GDP	Gross Domestic Product
GIS	Geographic Information System
GO	Gross Output
GRIT	Generation of Regional Input-Output Tables
GRP	Gross Regional Product
HOV	High-Occupancy Vehicle
HS	Harmonised System
IEA	International Energy Agency
I-O	Input-Output
IMPLAN	Impact Analysis for Planning
IRIO	Inter-Regional Input-Output
IRP	Integrated Resource Planning
ITS	Intelligent Transportation Systems
JIT	Just in Time

LCA	Lifecycle Cost Analysis
LINZ	Land Information New Zealand
LQ	Location Quotient
MAS	Multi-Agent Systems
MAPE	Mean Absolute Percentage Error
MED	Ministry of Economic Development
MIS	Management Information Systems
MO	Mitigation Option
MoT	Ministry of Transport
MPG	Miles per gallon
MPO	Metropolitan Planning Organizations
MRIO	Multi-Regional Input-Output
Mtoe	Million Tonnes of Oil Equivalent
NA96CC	National Accounts 1996 Commodity Classification
NAWI	National Account Working Industry
NFDS	National Freight Demand Study
NZNFM	New Zealand National Freight Matrix
NZD	New Zealand Dollar
NZTA	New Zealand Transport Agency
O-D	Origin-Destination
OECD	Organisation for Economic Co-operation and Development
OED	Oxford English Dictionary
OPEC	Organization of the Petroleum Exporting Countries
PAYD	Pay-As-You-Drive
PE	Percentage error
POLQ	Purchase-Only Location Quotient
REMI	Regional Economic Modelling, Inc
RIMS	Regional Input-Output Modelling System
RMSD	Root Mean Square Deviation
RMSPE	Root Mean Square Percentage Error
RTP	Regional Transportation Plan
RUC	Road User Charges
SAM	Social Accounting Matrix
SMILE	Strategic Model for Integrated Logistic Evaluations
SNZ	Statistics New Zealand
SUV	Sport Utility Vehicle
TB	Trip-based
TDM	Transportation (or Travel) Demand Management
TNZ	Transit New Zealand
TSM	Transportation System Management
UE	User Equilibrium
VKT	Vehicle Kilometres Travelled
VPD	Vehicles Per Day

1. INTRODUCTION

Freight transport involves the movement of goods from an origin to a destination by one or multiple modes. It embraces important features, such as infrastructure, staff, propulsion system and operation. Freight Transport Systems (FTS) provide access to many essential systems, e.g. food, raw materials and others. It is a complex inter-related system with passenger transport, land use, regional and national development and many others aspects of the economy. Freight transport is of paramount importance on modern society, but many times is overlooked by researchers and practitioners (Chin and Hwang, 2007). Nearly everything people use is shipped via a transportation network, which highlights the representativeness of goods movements in the economy and its significant contribution to development. Furthermore, freight movements impact daily on community’s well-being and has a key role in future transport provisions (ECan, 2005).

Worldwide, FTS are dependent on fossil fuels to maintain their performance and convenience to users. Goods movement is mainly performed by internal combustion engines, predominantly fuelled with fossil fuels. Fuel consumption is involved in most of the processes of extended supply chains, from the extraction of raw materials to processing and final disposal of goods (Lamming and Hampson, 1996). Such a dependency is especially prominent in transport stages of the supply chain.

In New Zealand, fossil fuel dependency is even further exacerbated: biodiesel is not widespread used; the rail and maritime networks are not efficiently operated; and the volume of freight and goods moved throughout the transportation system has grown significantly over the past few decades, with expectation of future increase (MOT, 2002). According to the Ministry of Transport (2008), the amount of freight moved is expected to more than double by 2040.

However, several evidences point to future fuel price increases and shortages. The New Zealand government admitted the probability of having events of fuel restrictions in the future (COVEC, 2005, MED, 2006, SEF, 2006). International and national forecasts show high likelihoods of increases in fossil fuel prices due to scarcity effects (Lee, 2006, Lucas *et al.*, 2006, MED, 2006, Dunlop, 2007, MED, 2007, MOT, 2007). Predictions of the global world oil peak (also known as Peak Oil) are widespread now and many scientists have also examined the issue of oil depletion (Campbell, 1997, Deffeyes, 2001, Laherrere, 2001). In addition, a growing number of documents have warned of problems for activities with high fossil fuel consumption, especially transportation (IPCC, 2001, MFE, 2001, O'Connell, 2005, DFT, 2007, EECA, 2007).

In this context, this introductory chapter gives a general overview of this research. This initial outline is then followed by the scientific problem statement. The second section investigates the scientific and social motivations in conducting this research. The objectives and the research method are the third and fourth sections, respectively. The final section of this chapter presents the thesis structure.

1.1. Scientific Problem

The risk of fuel constraints adversely affecting the economy is high due to the combination of significant impacts and probability of occurrence (Dantas *et al.*, 2006). The extent of this risk is still uncertain considering the current available scientific knowledge and people and society are likely to overlook the problems related to it. For instance, some might think that only private transport will be affected by fuel constraints because of its direct and crucial relationship with fuel use. However, it is more likely that a fuel constraint will also impact on the transport of goods and the other sectors of the economy, such as wholesale and retail trade, construction, manufacturing and extraction.

So, freight transport activities are amongst the sectors that are likely to be significantly affected due to their great dependence on fossil fuels and their importance to society. Freight transport provides a backbone for most of the supply chain systems and it is also mainly truck oriented worldwide. For instance, in New Zealand the road transport represents around 83% of all freight, in terms of carried tonnes (Bolland *et al.*, 2005). Nonetheless, road freight transport is one of the least fuel efficient modes (energy per tonne-km) second only to air freight transport. In addition, increases in freight transport costs can impact on the final price of goods, as carriers and shippers are likely to transfer the extra costs to their customers, generating a chain reaction of impacts on markets.

Based on this background, the scientific problem addressed in this thesis was ***"the identification of the impacts of fuel constraint on freight transport and the national economy".***

1.2. Motivation

This research project was based on two motivations, which can be grouped into categories, namely social and scientific. Firstly, the scientific motivation is presented. Lastly, the social implications of this study are explored.

1.2.1. Scientific Motivation

Conventionally, transport studies have assumed that fuel is an endless available resource. Their aim is to make transport systems and their components quicker, safer, more economically viable and reliable. Most of the traditional available literature does not even mention energy as a practical limitation in transportation planning and analysis. However, the concern with transportation fuel consumption, congestion and pollution has significantly grown over the past years. Recent literature presents us with an increasing number of studies about options to reduce the energy intensity of people's transport. In this backdrop, passenger transport has received plenty of attention from researchers and government and much progress has been made in this area in a short period of time.

Nonetheless, FTS lack in research on the implications of fuel constraints. Although freight transport consume less energy and has less kilometres travelled than passenger transport, the recent growth in freight transport has been dramatic (Newman, 2003). All predictions show further increase in freight transport and that energy consumption for freight movement will exceed that for people travel on a world-wide basis in the year 2020 (WEC, 1995). However, such forecasts of energy requirements for freight transport are not in line with the predictions of upcoming fuel constraints, unless governments intend to ration fuel for passenger travel and not for freight transport.

The imminent gap between increasing energy demand for freight transport and reduced fuel supply is an issue that needs to be studied. However, apparently in the governmental arena, freight transport is not of major concern as it is many times neglected in planning. Thus, public awareness of the importance of freight movements must be improved and it should not take a crisis to make the public recognize the value of reliable freight service (Regan *et al.*, 2001). Some reasons to overlook freight transport on policies are the lack of reliable data (ACEA, 2006), limited specific technical knowledge (Piecyk *et al.*, 2007), insufficient research initiatives in this area (Regan *et al.*, 2001) and unavailability of an appropriate performance measurement tool (Kawamura and Seetharaman, 2002).

Hence, it is necessary to develop freight transport policies that include the issue of sustainability in their agenda. These policies should embrace not only environmentally sustainable freight transport, but they should also comprise the other pillars of sustainability such as economic and social aspects (Liechti, 2002). In policy making, it is particularly important to include economic analysis because it subsequently provides information and supports the decision-making process towards high quality decisions.

Indeed, there are studies that examine the economic impacts of freight transport projects (see, for example, Litman, 2001, Fuller *et al.*, 2003, Schade and Rothengatter, 2004, Hensher and Puckett, 2005). However, there is little evidence in the literature of systematic efforts to assess the economic impacts of fuel constraints on freight transport. Additionally to that, two recent articles focused on similar issues: i) Noland and Wadud (2009) analysed how the road freight sector can rapidly save oil during a supply emergency. The paper provides a list of potential policies to reduce fuel consumption. Though it does not include any quantitative assessment, it includes a qualitative ranking of the feasibility and effectiveness of policies, based on review and experience, and ii) Kerschner & Hubacek (2009) have methodically assessed the economic effects of fuel constraints in three economies, e.g. UK, Japan and Chile. They have analysed the peak oil problem with a general economic perspective. Results have shown for the abovementioned countries a list of the ten most affected sectors, which featured sectors related to transport, such as water transport, ancillary transport, road transport, air transport and transport services.

In spite of studies previously presented, it can still be observed that there is a lack of a comprehensive method to assess the impacts of fuel restraints and interactions between the FTS and the economy. This fact contributes to scepticism about the sector and to a disregard of goods movement in planning strategies (Seetharaman *et al.*, 2003). Hence, alternatives to reduce energy consumption by freight transport, as well as the economic attractiveness of them, are not clear. Furthermore, the risks of fuel shortages for freight transport have not yet been efficiently examined. In this context, freight transport models and economic impact analysis were used to assess fuel constraint impacts. The method may support decision-making and planners to justify and evaluate investment options.

1.2.2. Social Motivation

Social and economic development relies on cheap petroleum and cheap long-haul transport. At urban levels, cities are spreading out with very low density housing; at the regional levels, it can be observed more complex supply chains that involve decentralization of suppliers and centralization of production. These factors, added to worldwide globalization, contribute to the urbanization of countries and to an increase in the distance travelled by goods from their production to destination points. This dependency on petroleum can cause a major disruption to essential and vital systems to our society (e.g. industrial, health, agriculture) in the case of a petroleum shortage event or large price increase. The consequences of shortages or large price increases may generate substantial impact to the FTS and the activities that it supports throughout the world. Finally, higher fuel prices may impact on the demand and supply of goods as operational costs are expected to increase, so product prices tend to be affected and essential services may diminish.

Besides, transport fuel prices have already varied quite dramatically over the last years and there is clear evidence that the easy access to cheap oil is coming to an end (Lucas *et al.*, 2006). Although there is uncertainty about when peak oil will occur, specialists all over the world are convinced that in the next 25 years oil will become more difficult to find, locations will be more remote, drilling will be deeper and prices will rise, ending the supply of cheap oil (Lee, 2006).

On a global scale, reduced availability of fuel, increases in oil prices and climate change have raised concerns over the future of energy for transport. In the regional level, implications of burning fossil fuels are seen in changes in climate, particularly increases in temperature, which affects a diverse set of physical and biological systems in many parts of the world. Thus, climate change is also a factor of raising concern with transportation fuel consumption, congestion and pollution. Some scientists affirm that climate change and peak oil are inextricably linked (Dunlop, 2007) and consider them as the two sides of the same coin (Leggett, 2001). A common solution for both problems is to significantly decrease fossil fuel consumption, which can be made through several ways, such as increasing fuel efficiency, technology and sustainable life-styles. Bentley (2002) affirms that unless radical changes occur in demand for hydrocarbons, shortages are inevitable.

Additionally, past oil crises such as in 1973 and 1979 caused unemployment and economic recession (Barsky and Kilian, 2002). Recent disruptions in fuel supply due to wars, natural disasters and hikes of oil prices (e.g. Lebanon 2006, Nigeria 2003, the Hurricane Katrina in 2005) have also confirmed their catastrophic effects on the economic structure of countries. Lyons & Chatterjee (2002) demonstrated the consequences associated with fuel protests in the UK in 2000 and how it affected lifestyle, businesses and even local governments. For instance, within days UK supermarkets began to ration sales of bread, milk and sugar, which highlight the strong impact that even short term fuel shortages can have in the economy and people's wellbeing. These consequences ultimately indicate that societies are not well prepared for sudden changes that impact lifestyle, especially when it deals directly with the convenient way we live nowadays.

In this complex social context, the impacts of fuel constraints need to be holistically investigated considering all sectors of the economy, as lack of planning and preparation can lead towards catastrophic consequences for modern society. For instance, just in New Zealand, downturns associated with fuel shortages to transport systems can be massive as more than 82% of total oil consumption in 2007 was related to transport activities (MED, 2008). Thus, FTS and the activities that they support throughout the world can greatly suffer in the case of fuel constraints. Furthermore, the freight growth pattern observed in the last twenty years in terms of total energy consumed and kilometres travelled seems to be incompatible with future fuel availability (Ayres, 1998). Finally, in contrast to what is observed in passenger transport, freight transport policies are less straightforward, harder to understand (Seetharaman *et al.*, 2003) and usually neglected by academia and governments.

1.3. Research Objectives

The main objective of this research is ***to develop a method to assess the impacts of fuel reductions on freight transport and the national economy***. In order to achieve this main objective as well as to tackle the scientific problem previously stated, a series of specific objectives are defined as follows:

- To identify the theories, techniques and knowledge needed to assess and mitigate the impacts of fuel reductions on freight transport and the national economy;
- To understand the relationships between fuel use, economic systems and transport systems;
- To research the dynamics of fuel use and the energy required for goods movements;
- To analyse the economy in a systematic and quantitative way, including the interrelationships of a complex economic system;
- To examine the New Zealand economy and its peculiarities;
- To develop a freight transportation model to strategically analyse the transport system incorporating freight forecasts and modelling techniques;
- To build and calibrate a freight transport model of New Zealand in a geospatial framework;
- To analyse how fuel constraints impact on freight transport and economy;
- To investigate the impacts of fuel constraints in New Zealand; and
- To apply the method to New Zealand in order to identify the strengths and weaknesses of the proposed method.

1.4. Research Method

In order to reach the scientific objectives, the research method was designed to conduct a comprehensive study about fuel constraint impacts on freight transport and economy. It comprises six phases as illustrated in Figure 1.1 and described as follow.

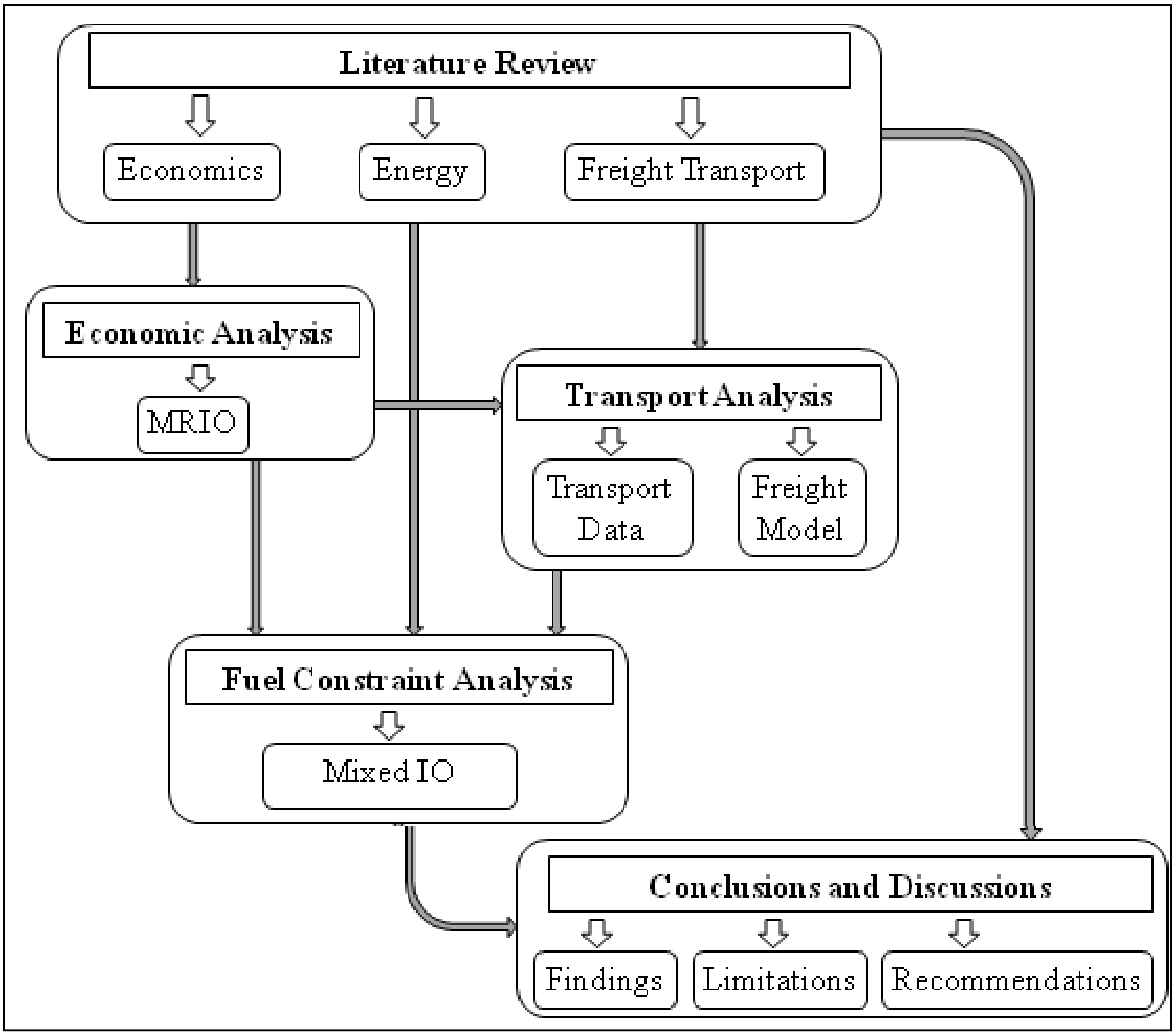

Figure 1.1: Research method

The literature review for this research covered different topics to create an essential knowledge base to conduct this research. It reviews the critical points of current knowledge, highlighting future research needs. The main topics studied were energy (energy consumption and forecasts of oil supply); freight transport (especially freight transport models) and economics (transport economics, economic impact analysis, input-output analysis). The supporting theories support the development of the next research phases.

Prior to analysing the impacts of a reduction in fuel availability it was essential to first understand the current economic system. The economy was investigated through a Multi-Regional Input-Output model (MRIO), which indicated the level of monetary transactions between regions and all the sectors of the economy. The economic analysis framework is conceptualized and then applied to New Zealand. Results of the application are observed and analysed.

To understand the impact of fuel availability changes, the current freight transport system was studied under a comprehensive framework considering both the economic and the transportation approaches. The economic relationships between regions and the transport network were combined with a freight transport model. For the specific case of New Zealand, economic relations are modelled using the MRIO method. The transport data was collected from a number of nationally owned organisations, processed and organized, including both geographic and non-geographic data. Freight transport modelling routines of combined models were developed and applied to New Zealand. The model was then calibrated and tested using observed traffic flows.

The economic and freight transport analyses were modified to examine the impact of fuel constraints. A complementary literature review of Input-Output models was conducted because traditional models were not consistent with the issues of peak oil. A mixed Input-Output was chosen and applied to New Zealand to calculate the economic impacts of fuel constraints. The economic impacts affected the freight transport demand and supply, and the impacts were calculated in terms of the number of trips lost and other impacts on the physical distribution of goods.

1.5. Thesis Structure

This thesis is divided into six chapters in order to clearly describe all the performed activities. After this introduction, Chapter 2 presents the Literature Review conducted for this study. It covers the essential topics studied to gain a detailed understanding of existing research and knowledge available in the related research areas and how they can be applied in this project. Concepts such as Energy Supply and Demand, Freight Transport, Basic Economics, Transport Economics and Peak Oil Economics are presented as well as the counterpart of each discussed topic.

The third chapter evaluates the current economic system through a national and a Multi-Regional Input-Output model (MRIO), which indicates the level of monetary transactions between regions and all the sectors of the economy. The concept of MRIO to identify the regional differentiation of the economy is explained. The input-output table for New Zealand economy is then updated and the MRIO applied. Results of the application are observed and analysed, as well as limitations of the analysis.

Chapter 4 describes the activities conducted to model freight movements. Initially, three steps to conduct an analysis of the freight system are conceptualized, and they are: the calculation of commodity flows through converting MRIO outputs into transport data and manipulating other freight transport data; build the transport database by gathering and treating transport and spatial data to integrate the transportation network in a GIS system; and the freight transport model is estimated. The steps are then applied to New Zealand and the model is calibrated and tested. Finally, results are analysed and conclusions are drawn.

The fifth chapter explores fuel constraints impacts on the economy and the freight transport. Initially we describe the assessment of peak oil, which is divided into determining the constrained sector and stipulating the constraint. The Input-Output technique and alternatives to the traditional model are investigated to identify the best model to analyse fuel constraint impacts on the economy. Mixed Input-Output is explained and applied to New Zealand. The freight transport model presented in Chapter 4 is used to calculate fuel constraint impacts on the freight transport system. Finally other impacts of peak oil are investigated.

Finally, the last chapter summarizes the research and all the steps taken to reach its main objective. A critical analysis of the whole research is conducted and both successes and shortfalls are reported. Areas for further improvement are summarized and recommendations for future are proposed in this chapter.

2. LITERATURE REVIEW

This chapter reviews the concepts relevant to the understanding and development of this research. It is divided into three main topics: Economics, Freight Transport and Energy. The chapter focuses on reporting the state-of-the-art of these topics, their later developments and variations, which sometimes also include the state-of-the-practice, when relevant. At the end of this chapter, section 2.5 is a discussion section summarizing the main findings, and highlighting how to apply each conceptual framework in this thesis.

2.1. Economics

Economics is a field of social sciences, which studies the production, distribution and consumption of goods and services and the wealth transfer amongst individuals (OED, 1989). Economics can be divided in two main streams: microeconomics and macroeconomics. Microeconomics studies individual decisions made by households and firms. It examines how prices affect these decisions and the supply and demand of goods and services; and how prices are determined by them. On the other hand, macroeconomics broadens the scope by studying the economy as a whole. So, it deals with national or regional levels or with entire industries.

The next sub-sections describe the importance of economic impact analysis, as a measurement of the effects of a policy, program, project activity or event on the economy of a given area. These can be either micro or macro, depending on the scale of the analysis. Later in the section, it explores the Input-Output Model, a widely used economic impact analysis technique, and the developments and applications of the model, focused on transport and peak oil.

2.1.1. Economic Impact Analysis

Economic impact analysis are a set of techniques used to measure changes in economic activity resulting from specific programs or projects (Hudson, 2001). It estimates the potential economic benefits of interventions and helps in determining best value projects. From a public policy and planning perspective, economic impact analyses are employed to market resources and also to scarce and valued resources (Litman, 2001). Economic impact analysis aims to estimate meaningful impact measures of changes in sales, tax revenues, income and jobs (Carleyolsen *et al.*, 2005) and it has been widely used in transportation decision making.

There are many techniques to analyse economic impacts. The techniques can be divided into partial equilibrium models and general equilibrium models. The partial equilibrium models include export-base models, cost analysis (benefit cost analysis, cost effectiveness analysis, etc.) and econometric models. Partial equilibrium models are limited in their analytic approach because they focus on specific sectors, or one sector only (Liu and Chen, 2004). Thus, variations in one sector will be considered, with the other sectors being kept constant, i.e. ignoring the economy-wide effects.

In contrast, general equilibrium models take into account the interrelationship between sectors and markets. Thus, it provides a more comprehensive framework to conduct economic impact analysis. To do a general equilibrium analysis an Input-Output (I-O) model, a Computable General Equilibrium (CGE) model or a Social Accounting Matrix (SAM) model may be used (Liu and Chen, 2004). The decision about which method to use should be based on the study goals, available resources, how quickly the data are needed and available (Vogelsong *et al.*, 2001). Among the general equilibrium models, I-O models are the most commonly used and the one which has smaller data requirements. I-O also suits well the research objective of evaluating the impacts of fuel constraint scenarios on freight transport and economy; and does not involve a great number of complementary data, such as secondary statistics or economics data. Moreover, there are many commercially available I-O models and that have been widely applied for transportation analysis (Lynch, 2000). For these reasons I-O models are further investigated and developed.

2.1.1.1. Input-Output Models

The I-O analysis quantifies systematically the mutual interrelationships among various sectors of a complex economic system (Leontief, 1986). It was first developed by Leontief in 1932 and first published a few years later (Leontief, 1936). The author received, in 1973, the Nobel Prize in economic sciences for the development of this method. An Input-Output Model is a specific formulation of I-O analysis, and it is also called the Leontief Model or Standard I-O.

When the I-O model was first developed its applicability was impractical due to computational requirements. After the development of reliable computers in the 1960s the I-O method started to be adopted in many countries as the method of analysis, forecasting and planning national and regional economic structures. Even though the data requirements were enormous, because the expenditures and revenues of each branch of economic activity had to be represented, many countries started to collect and prepare these data. Currently, most of the countries have their I-O models and the existing computational capabilities make such modelling practical.

The Leontief Model considers inter-industry relations in an economy. The model depicts how an industry's output serves another industry as inputs, thereby creating an interdependent system (Canada, 2007). It has the ability to assess how changes in a particular sector affect directly and indirectly other sectors and therefore the entire economy. The centre element of the I-O Model is a matrix representation of the economy, namely the transaction table. It shows the monetary flows of goods and services in a local economy for a given time period, usually one year. Leontief (1986) defines a transaction table as the flow of goods and services between all the individual sectors of a national economy over a period of time; i.e. how much each sector sell to the other sectors and buy from the other sectors. Typically these tables are compiled retrospectively as a cross-section of the economy once every few years. Table 2.1 illustrates a hypothetical transaction table (rounded numbers).

Table 2.1: Example of a transaction table ($ millions)

Buying Industry / Selling Industry	Extraction	Construction	Manufacturing	Trade	Service	Total industry demand	Households	Other local final demand	Exports	Total final demand	**Total demand**
Extraction	190	31	599	6	73	899	99	88	596	782	**1,681**
Construction	14	7	43	14	293	370	0	1,803	353	2,155	**2,525**
Manufacturing	142	414	3,235	110	356	4,257	1,275	1,130	9,344	11,750	**16,007**
Trade	52	224	520	93	257	1,147	2,563	161	970	3,695	**4,841**
Service	102	221	862	558	2,001	3,744	4,262	523	2,828	7,613	**11,358**
Total local inputs	500	897	5,260	781	2,980	10,417	8,199	3,705	14,091	25,995	**36,413**
Households	595	665	3,696	2,385	4,603	11,944	180	2,524	0	2,704	**14,648**
Other payments	261	191	1,624	1,365	2,402	5,842	3,789	950	1,098	5,837	**11,679**
Imports	325	773	5,428	311	1,372	8,209	3,778	1,057	-10,325	-5,490	**2,719**
Total final payments	1,181	1,629	10,747	4,060	8,378	25,995	7,747	4,531	-9,228	3,051	**29,046**
Total inputs	**1,681**	**2,526**	**16,007**	**4,841**	**11,358**	**36,413**	**15,946**	**8,235**	**4,864**	**29,046**	**65,459**

Table 2.1 records the transactions between five broad industries (extraction, construction, manufacturing, trade and service), three final-payments sectors (households, other payments and imports), and three final-demand sectors (households, other local final demand and exports). Each row records the sales (output) by the industry named at the left of the table to the industries or final consumers identified across the top of the table. The total sale of a sector to the other sectors is labelled total local inputs. For the example of Table 2.1, from the total output worth \$4,841 million of the trade industry, \$224 million is sold to construction.

Each column in a transaction table accounts for the purchases of the industry or final consumer identified at the top of the column from the selling industries named at the left. Sales to final markets are recorded in the last columns of the transaction table and are called final demand. The final demands include sales to households (consumers), to private non-profit institutions serving households, to central and local government, to (private) investment purposes and to outside the region or abroad (exports), plus changes in inventories. This demand is normally for products in their final form, not as an input to a production process.

Payments by the industries to employees, owners of capital, and governments are included in the first two rows of the final-payments section of the table. Purchases from industries outside the region are identified in the last row of the final payments section and are called 'imports'. These imports may be either of goods not produced whatsoever in the region or produced in insufficient quantities to meet local needs. The final payments sectors are also named the 'value added' of the industry. Value added excluding imports is equivalent to gross domestic product (GDP), which is the same as total final demand minus imports.

The sum of the entries in each column represents the total purchases by that industry (total input), X_j. Total purchases and payments must equal total sales and demand ($X_j = X_i$) as all financial transactions are included in a transaction table, such as profits, losses, depreciation and taxes. Thus, inputs are equal to outputs; hence the term input-output (I-O). The Equation 2.1 depicts a transaction table in a matrix representation and Equation 2.2 describes the mathematic formulations of it. Please note that the matrix notation used in this thesis follows the economics style, which is different to the traditional engineering style.

$$\begin{bmatrix} X_1 \\ X_2 \\ \vdots \\ X_n \end{bmatrix} = \begin{bmatrix} z_{11} + z_{12} + \dots z_{1n} \\ z_{21} + z_{22} + \dots z_{2n} \\ \vdots \\ z_{n1} + z_{n2} + \dots z_{nn} \end{bmatrix} + \begin{bmatrix} Y_1 \\ Y_2 \\ \vdots \\ Y_n \end{bmatrix} \qquad (2.1)$$

$$X_i = z_{i1} + z_{i2} + ... + z_{ii} + ...z_{in} + Y_i \Rightarrow X_i = \sum_{j=1}^{n} z_{ij} + Y_i \qquad (2.2)$$

where:

X_i = n-element column vector with elements X_1 through X_n; representing total output (production) of sector i;

Y_i = n-element column vector with elements Y_1 through Y_n; representing total final demand for sector i's product;

z_{ij} = monetary value of the flow from sector i to sector j;

Z = matrix of all z_{ij} elements;

$i, j = 1, \dots, n$, where n represents the number of sectors.

The total output of sector i is equal to the inter-industry sales by sector i, as written in Equation 2.2, $X_i = \sum_{j=1}^{n} z_{ij} + Y_i$.

The economic activities that make business decisions based on their income are included in z_{ij} and are called endogenous activities because the behaviour is determined within the system (Schaffer, 1999). However, in any economy, some sales are made to sectors external to the industries. These sales, such as government expenditures, are normally included as a final demand (Miller and Blair, 1985). These activities are based on decisions made outside the system and are called exogenous.

The distinction between an endogenous and an exogenous activity is sometimes not simple. For instance, the household sector is conventionally classified as a final demand sector, but it is many times considered as an endogenous industry. The household sector is one of the most significant sectors in any economy, in terms of economic activity. In the example given on Table 2.1 it has the second highest input and output. Households sell labour, skills, privately owned resources, etc., and receive in return wages and salaries, dividends, rents, etc. In order to generate these outcomes, households buy food, clothing, housing, services, and other consumer goods (Schaffer, 1999). Therefore, households can be included as an endogenous industry, and the model is then called closed with respect to households. The model can also be closed with respect to other industries, by including that industry as endogenous to the economic system.

Although a transaction table imparts some information about the economy, it does not clarify how the economy reacts subjected to changes (Schaffer, 1999). The aim of an I-O analysis is to know the effects on the economy of changes in elements that are exogenous to the model (Miller and Blair, 1985). To do so, a set of technical conditions are introduced as a ratio of input to total output. These conditions are called direct requirements, inter-industry coefficients or production coefficients, represented in Equation 2.3 as a_{ij}.

$$a_{ij} = z_{ij} / X_j \qquad (2.3)$$

where,

X_j = row vector with elements X_1 through X_n; representing total input (consumption) of sector j

Let A be the $n \times n$ matrix of inter-industry coefficients a_{ij}. The direct requirements table creates a production recipe, showing how one sector's purchases of resources is made from all sectors to produce one dollar of output (Harris and Doeksen, 2003).

Equation 2.3 can be rewritten to isolate the inter-industry coefficients as shown in Equation 2.4. Alternatively, it can express the total sales of one industry as in Equation 2.5. Combining these two equations and rearranging the variables we can produce Equation 2.6, which is named the Leontief solution.

$$X_j = \frac{z_{1j}}{a_{1j}} = \frac{z_{2j}}{a_{2j}} = \frac{z_{3j}}{a_{3j}} = \frac{z_{nj}}{a_{nj}} \qquad (2.4)$$

$$X_1 = a_{11}X_1 + a_{12}X_2 + ... + a_{1n}X_n + Y_1 \qquad (2.5)$$

$$(I - A)X_i = Y_i \text{ or } X = (I - A)^{-1}Y \text{ or } X = \alpha Y \tag{2.6}$$

where:

I = square identity matrix, such as $n \times n$

$(I - A)$ = $n \times n$ Leontief matrix

$(I - A)^{-1}$ = $n \times n$ Leontief inverse = α

The Leontief solution summarizes the I-O model and is a very common expression. It is frequently used to derive all the other I-O modelling approaches. Other descriptive names for the Leontief matrix are total input coefficients matrix, multiplier matrix and total requirements table. Note that only if $|I - A|$ is non-zero it is possible to find α. These equations represent an open model, in which all final demand sectors are exogenous to the system. When the system is closed, for instance with respect to households, the I-O model is written with a macron (¯) over the letters X and Y, as $\overline{X} = (I - A)^{-1}\overline{Y}$. This notation refers to exogenous sectors endogenised into the system.

When carrying out an I-O analysis it is important to focus on the purpose of solving the model. The basic question that the I-O model is answering is how much output each sector would have to supply if the demands of the exogenous sectors were forecasted to be some specific amount next year? For instance, if the demand of the transportation sector would increase 10%, how much would all the other sectors of the economy have to produce to generate this final demand? Calling the new value of final demand of the transportation sector $Y(2)$ and forecasting this value, Equation 2.6 is applied to calculate the new value of the total input of the transportation sector, $X(2)$. Alternatively, a variation of final demand, ΔY, can be used to calculate the variation in input, ΔX, as shown in Equation 2.7.

$$\Delta Y = (I - A)\Delta X \tag{2.7}$$

The I-O model has some assumptions that support its analysis, as follows:

- In the absence of exogenous assumptions to the contrary, a sector uses inputs in fixed proportions. This means that the input coefficients of matrices A, X_j and z_{ij} remain constant for variations in Y;
- Output is a linear function of final demand; and
- There is no scarcity factor.

A rationale for the first assumption (fixed coefficients) is that a_{ij} represents the most efficient technology available to produce that good, and it is assumed to remain the optimal one even if there are variations in the composition of final demand (Steenge and Duchin, 2007). A more realistic approach to justify this is that these technologies are effectively in place and cannot be quickly changed. Hence, the longer the period of projection of *Y*, the lower the accuracy of the model will be.

The ability to forecast new final demand accurately into the future is diminished once the tastes of consumers and technology of production change and are put in place. Those changes would make the coefficient matrix out of date (Miller and Blair, 1985). However, for a certain period of time the coefficients can be expected to remain roughly static because changes occur slowly (i.e. the system is relatively stable). Therefore, the model can be used, even though it may appear out of date (Carter, 1970). In previous examples, as described by Miller and Blair (1985), the error of forecast for the economic impact for 22 years was about 3% and the error for 14 years was about 0.6%. Although individual elements can be poorly estimated, the forecast can be quite precise for higher levels of aggregation (Parikh, 1979).

The second assumption (of linearity) means that no economies of scale are considered. For instance, if the input of a sector increases 10% the output of this sector will also increase 10%; or if final demand of all goods increases 5%, the total required output from each sector would also increase by this same percentage (Steenge and Duchin, 2007). This can mean that for a long term analysis the estimated impacts will probably be overvalued (Park and Gordon, 2007), but apparently this is not considered as a restrictive issue of the I-O model.

However, the third assumption (no scarcity factor) is the main problem. This means that there is always unused capacity and that all input requirements for the production of a product is automatically and instantly met (Kerschner and Hubacek, 2009). This assumption is valid only when the factor-supply curves are very elastic and there is spare capacity in all industries of the economy (Giarratani, 1976). This characteristic of the standard I-O model becomes a major barrier when analysing supply constraints.

On the other hand, a positive characteristic of the model is that there is a range of commercially available I-O models. They can and have been used to evaluate transportation projects, for different levels of complexity and costs. Lynch (2000) analysed three models that can be used for transportation projects: RIMS (Regional Input-Output Modelling System), IMPLAN (Impact Analysis for Planning) and REMI (Regional Economic Modelling, Inc). Lynch shows how to apply them; how they work; how to interpret, use, compare and display the results; the differences; and the advantages and disadvantages of each of the three models. According to Lynch, IMPLAN and REMI are computer software packages, which make these models easier to use and change, with IMPLAN being more user friendly than the others. In contrast, RIMS is a spreadsheet analysis, being more difficult to change, but giving extra options in terms of inflating or deflating the data. In spite of the existence and practicability of these models, they are designed only for the USA. Thus, implementations of IMPLAN, REMI and RIMS for other countries are difficult and demanding.

Also, I-O models have developed and improved theoretically and practically over the years. Examples of the developments in I-O modelling are the transition from a static to a dynamic version of the I-O; the capital investments lag of one or more years; the inclusion of environmental factors; analysis and estimation of the further development of the world economy; the use as a tool for forecasting and forming long and medium term indicative planning of national economy; and the development of the supply driven I-O model.

Thus, I-O models are valuable economic analysis tools. They serve a vast range of purposes, calculating the impacts of changes in one sector on all the other sectors and to the economy as a whole. Nonetheless, the specific objective of this thesis is to analyse the impacts of fuel supply constraints, which is limited by the assumption of the standard I-O models that means it does not incorporate scarcity in the analysis. When Peak Oil happens, there will be no excess capacity[1] in the economy, nor a perfect substitute to fuel in the short or medium term. Hence, alternatives to the standard I-O models were investigated and are presented in the next subsections. Initially, the supply driven I-O model is examined because it has been designed to evaluate economic effects when there is a scarce input in the system, meeting the need of this research.

2.1.1.2. Supply Driven Input-Output

The supply driven I-O was first formulated by Ghosh (1958). The Ghosh Model (or sales-coefficient or allocation model) is designed to trace the economic implications of changes in the final payments sector. It is made by examining the 'bottleneck' effects according to the changes in the final payments sectors (Park, 2007). Thus, the model assumes that there is no unused capacity and that all resources are scarce except for one sector. The sales-coefficient model is described in Equation 2.8, which corresponds to the direct requirements of the standard model (Equation 2.2).

$$b_{ij} = x_{ij} / X_i \tag{2.8}$$

b_{ij} = sales coefficient of sector i to sector j = proportion of sales of sector i to sector j
x_{ij} = sales of sector i to sector j
X_i = total sales (output) of sector i

Equation 2.8 shows the foundation of the allocation model, based on a direct output coefficient matrix or sales coefficient matrix. This is the total opposite of the standard Leontief Model, which is built upon a direct-input coefficient matrix and is demand oriented.

The allocation model can be partitioned into unconstrained sectors (not subjective to scarcity constraints), represented by the subscript *r*, and constrained sectors, represented by the subscript *s*, as shown in Equations 2.9.

$$B = \begin{bmatrix} B_{ss} & B_{sr} \\ B_{rs} & B_{rr} \end{bmatrix} \tag{2.9}$$

[1] Excess capacity means that the current production is less than a producer's potential capacity.

where:

B = $n \times n$ matrix of sales coefficients b_{ij}

n = $r+s$, for r and s smaller than n ($r < n$ and $s < n$)

B_{sr} = $(s \times r)$ matrix containing elements from the first s columns and the last r rows of the B matrix, representing the sales coefficients of outputs by the s unconstrained industries of the r constrained industries inputs;

B_{rs} = $(r \times s)$ matrix containing elements from the last r columns and the first s rows of the B matrix, representing the sales coefficients of outputs by the r constrained industries of inputs to the s unconstrained industries;

B_{ss} = $(s \times s)$ matrix containing the elements from the first s rows and the first s columns of the B matrix, representing the sales coefficients between the s unconstrained industries;

Given the final payments of the unconstrained sectors, the new outputs of the unconstrained sectors can be determined by Equation 2.10. Similarly, given a value of outputs for the constrained sector, the final payments of the constrained sector can be determined by Equation 2.11.

$$X_s = (\overline{X}_r B_{rs} + \overline{V}_s)(I - B_{ss})^{-1} \tag{2.10}$$

$$V_r = \overline{X}_r (I - B_{rr}) - X_s B_{sr} \tag{2.11}$$

where:

$\overline{X}_r$ = (r)-element row vector $1 \times r$ with elements X_s through X_r; representing total input of the constrained industry;

X_s = (s)-element row vector with elements X_1 through X_s; representing total input of unconstrained industries;

V_r = row vector of final payments of the r constrained industries;

$\overline{V}_s$ = row vector of final payments of the s unconstrained industries;

I = identity matrix, having the size of $s \times s$ in Equation 2.10 and $r \times r$ in Equation 2.11;

The model assumes that final demand changes do not affect the sales coefficients because the coefficients are fixed: output distribution patterns in an economic system are stable or output coefficients are fixed. It means that if output of sector i is doubled, then the sales from i to the other sectors will also be doubled. Additional assumptions are i) unchanged vector of final payments for the unconstrained sectors; ii) altered vector of final payments for the constrained sector; and iii) perfect substitutability between factors.

The model also presupposes a monopolistic or a centrally planned economy approach. It considers the best feasible combination of the unconstrained (non-scarce) sector based on the rest of the scarce resources with respect to a welfare function (Ghosh, 1964). This is a reasonable approach for analysing oil shocks. While the oil market is an oligopoly with competitive elements, the monopolistic characteristics prevail, such as price controlling (Cohen, 2007), and it is not easy to find alternative suppliers of oil in the short run. The model ultimately considers how the forward inter-industry allocation processes work. This suggests that not necessarily value-added factors have to rise to increase total outputs, if the expected final demands are to satisfy the minimum requirements (Park, 2007).

An important debate about the supply driven I-O model is related to its stability. Oosterhaven (1988, 1989, 1996) stresses that the way the model is formulated implies that input factors might be combined without any technological relationship. He concluded that this model is implausible and should not be used. However, Davar (2005) states that the model might be plausible in practice. In addition, Dietzenbacher (1997) says that the allocation model is an absolute price model equivalent to the Leontief price I-O model. His interpretation of the model is that it is not a quantity model, which limits the applicability of the model as an impact analysis tool. These contradictory conclusions indicate the need to further analyse the applicability of the model, and that resolving the dilemma might not be a simple task.

Park (2007) facilitates the applicability of the supply driven I-O model by presenting four main conditions for correctly using it:

- Monopoly;
- Scarcity of factors;
- Short period; and
- Small region (little dependence on imports).

Park suggests that if the case study meets these four criteria, then the supply driven I-O can be applied. However, the model still needs to be applied with care and the results should not be used in major decisions, but only for descriptive analyses (2007). While, this model appeared to be promising due to its initial assumptions, it is unclear whether it is reliable to use this model or not. Thus, it was decided to find another method to analyze the impacts of supply constraints. The alternative was the supply constrained or mixed I-O model.

2.1.1.3. Mixed Input-Output Model

The mixed I-O model was developed by Stone (1961) to improve the evaluation of economic impacts in the case of a supply constraint, and for this reason the model is also called supply constrained I-O. The author received the 1984 Nobel Prize in Economics for the contributions to the development of systems of national accounts. The mixed I-O is designed to trace the economic implications of a reduction in productive capacity on one or more industries of the final demand. It is based on the purchase coefficients A, as in the standard Leontief model, with exogenous specifications of the constrained sectors. It is named the mixed I-O model because of the presence of both exogenous and endogenous variables.

The mixed I-O is used to estimate impacts on all sectors of a reduction in output of the supply-constrained sector(s). This approach allows the final demand of the constrained sectors and the gross output of the remaining sectors to be specified exogenously. The model is then partitioned into constrained and unconstrained sectors. The unconstrained sectors are the first k sectors of the table; and the last $(n-k)$ sectors of the table are the supply constrained sectors. The k sectors are considered endogenous to the system and the $(n-k)$ sectors exogenous. The new outputs of the unconstrained sectors and the final demands of the constrained sectors are estimated by Equation 2.12. To do so, it is necessary to specify the values for the outputs of the constrained sector ($\overline{X}_{co}$) and final demands of the unconstrained sectors ($\overline{Y}_{no}$).

$$\begin{bmatrix} X_{no} \\ Y_{co} \end{bmatrix} = \begin{bmatrix} P & 0 \\ R & -1 \end{bmatrix}^{-1} \begin{bmatrix} I & Q \\ 0 & S \end{bmatrix} \begin{bmatrix} \overline{Y}_{no} \\ \overline{X}_{co} \end{bmatrix} \tag{2.12}$$

where:

X_{no} = k-element column vector with elements X_1 through X_k; representing endogenous total output of non-supply-constrained sectors;

Y_{co} = $(n-k)$ -element column vector with elements Y_{k+1} through Y_n , representing endogenous final demand of supply-constrained sector;

P = $(k \times k)$ matrix containing the elements from the first k rows and the first k columns in $(I-A)$. It provides the average expenditure propensities of non-supply-constrained sectors;

R = $[(n-k) \times k]$ matrix containing elements from the last $(n-k)$ rows and the first k columns of $(I-A)$. It provides average expenditure propensities of non-supply-constrained sectors on the supply-constrained sector output;

0 = Zero or null matrix, with all its entries being zero, being $[k \times (n-k)]$ or $[(n-k) \times k]$ matrices;

-1 = $[(n-k) \times k]$ matrix with all its elements being -1;

Q = $[k \times (n-k)]$ matrix of elements from the last $(n-k)$ column and first k rows of $-(I-A)$. It represents supply constrained sector expenditure propensities on non-supply-constrained sectors outputs;

S = $[(n-k) \times (n-k)]$ matrix of elements from the last $(n-k)$ rows and columns of $-(I-A)$, and represents average expenditure propensities among supply-constrained sectors;

$\bar{Y}_{no}$ = k-element column vector of elements Y_1 through Y_k, representing exogenous final demand for non-supply-constrained sectors; and

$\bar{X}_{co}$ = (n – k)-element column vector of elements X_{k+1} through X_n , representing exogenous total output for supply-constrained sectors.

The assumptions that support this model are described as follows:

- Unchanged matrix A of purchase coefficients; and
- Unchanged vector of final demand for the unconstrained sectors.

The first assumption means that the input distribution patterns are constant in an economic system. The second restriction implies that the unconstrained sectors keep the same level of sales to final markets (households, government, private investments and exports). However, the final demand for the production of the constrained sector varies. This limits the model as the endogenous demand of the unconstrained sectors is reduced but the imports, exports and household consumption do not change. Other than these assumptions, this model does not have major limitations that restrict its use.

However, it is important to emphasize that the mixed I-O is not a widespread model and is still relatively new. Even though the initial model was created in 1961 , after that not much improvement and analysis were made. However, the applications done so far had valid results and did not show any problem or limitation to its use (Giarratani, 1976, Davis and Salkin, 1984, Subramanian and Sadoulet, 1990, Hubacek and Sun, 2001a). Therefore, developments and applications of this method are useful to enhance the understanding of the mixed I-O model.

2.1.1.4. Multiplier Analysis

Input-Output models are most commonly used to trace individual changes in elements that are exogenous to the model of the economy. Thus, it is called impact analysis when the changes are expected to occur in the short run and when exogenous changes occur because of actions on only one ‘impacting agent’, or a few of them. Multipliers represent a quantitative expression of the extent to which some initial, exogenous force or change is expected to impact on the economic system. The additional effects are produced through interdependencies associated with some assumed and/or empirically established, ‘endogenous’ linkage system, giving the ‘ripple’ effect.

Often multipliers are used in real world applications of I-O, and they are widely used in impact analysis. In I-O analysis, there are many different multipliers. The three most frequently calculated are the output multiplier (the effect of exogenous changes on the outputs of the sectors in the economy); the income multipliers (effects of exogenous changes on income earned by households because of new outputs); and the employment multiplier (employment that is expected to be generated because of the new outputs) (Miller and Blair, 1985). Multipliers are popular because they calculate the total effect of a change in output, income or employment. The total effects can be calculated through the direct and indirect effects resulting from the interdependencies that exist between industries and the economy. When the model is open with respect to households then simple multipliers are calculated (type I multipliers), and when the model is closed with respect to households, total multipliers are estimated, which include direct, indirect and induced effects of changes (type II multipliers).

Output Multipliers

Output Multipliers ($M(o)_j$) relate a unit of spending (i') to an increase in output in the economy. It is the total value of production in all sectors of the economy that is necessary in order to satisfy a dollar's worth of final demand for sector *j*'s output. For the simple output multiplier this total production is the direct and indirect output effect, obtained from a model in which households are exogenous. The multiplier is the ratio of the direct and indirect effect to the initial effect alone, which is obtained directly from the Leontief inverse, α_{ij} , as in Equation 2.13.

$$M(o)_j = i'\Delta X = \sum_{i=1}^{n} \alpha_{ij} \qquad (2.13)$$

Income Multipliers

Income multipliers ($M(h)_j$) translate changes in final demand spending into changes in income received by households (labour supply), rather than translating the final demand changes into total value of sectoral output. The most straightforward way to do it is convert each element in a particular column of $(I - A)^{-1}$, which measures the value of direct plus indirect output effects, into the monetary worth of household income via household input coefficients ($a_{n+1,i}$). These are the coefficients that make up the *(n + 1)*st (household) row, that is used in closing the model with respect to households, and which indicate household income received per dollar's worth of sectoral output, as shown in Equation 2.14. Thus, the direct plus indirect effects for sector *j* would be in terms of the monetary worth of new household income, and the initial effect is in terms of one dollar's worth of final demand and hence output, for sector *j*, i.e. they translate an initial \$1.00 output estimate (which comes from an initial \$1.00 final-demand change) into an expanded (direct plus indirect) estimate of the value of resulting employment (household income).

$$M(h)_j = \sum_{i=1}^{n(n+1)} a_{n+1,i} \alpha_{ij} \qquad (2.14)$$

The above multipliers are called simple and total (economy closed to household) income multipliers. The difference between simple and total income multiplier is that the summation in Equation 2.14 goes up to $i = n$ for the simple income multiplier, and up to $i = n + 1$ for the total multiplier.

Other kinds of multipliers can be calculated (normally called type I and type II income multipliers), as in Equation 2.15 and 2.16.

$$M(h)_j^{\ I} = \frac{\sum_{i=1}^{n} a_{n+1,i}\alpha_{ij}}{a_{n+1,j}} = \frac{M(h)_j}{a_{n+1,j}} \tag{2.15}$$

$$M(h)_j^{\ II} = \frac{\alpha_{n+i,j}}{a_{n+1,j}} \tag{2.16}$$

Type I and type II multipliers are employed more often than simple and total multipliers. These multipliers show by how much the initial income effect ($a_{n+1,i}$) is augmented when direct, indirect and induced (caused by an increase in household consumption due to an increase in income) effects are taken into account. The type I multiplier demonstrates the ratio of the direct-plus-indirect income effects to the direct income effect alone. Thus, type I multipliers have the simple household multiplier as a numerator and the initial labour income effect ($a_{n+1,i}$) as denominator, as in Equation 2.15.

The choice of which income multiplier to use depends on the nature of the exogenous change of the analysed impacts. For instance, if one wants to know how much an increase in output of one sector would affect the income earned by households in the economy, then simple and total income multipliers should be used. On the other hand, if one wants to know how much household income would be lost through the economy by reducing the output of a sector, then type I and type II multipliers should be used.

Income multipliers are more instructive than output multipliers. Output multipliers double-count transactions, which can mislead lay people into believing that is possible to obtain more wealth out of an economy than what is put in, and leads the sceptical to completely ignore multiplier analysis. However, income multipliers report the supply of money that is available for employees to spend as income.

Employment Multipliers

Similarly to the income multiplier, employment multipliers (or government multipliers) can be created by closing the model for a different agent of the final demand sector. Employment multipliers can be calculated as previously done for income. An employment coefficient is used instead of a direct value added coefficient, as shown in Equation 2.17.

$$M(e)_j = \frac{FTE_j}{X_j}\alpha_{ij} \tag{2.17}$$

The employment coefficient is the ratio of number of people directly employed by the industry (FTE_j) per unit of industry output (X_j). Employment multipliers ($M(e)_j$) allow forecasting of employment level increases associated with increases in final demand in a given industry.

To the extent that the results of an input-output analysis (with households exogenous) tend to underestimate total effects (since household activity is absent), total or type II multipliers probably overestimate impacts (because of the rigid assumptions about labour incomes and attendant consumer spending). Yet, total or type II multipliers may be more useful than simple or type I multipliers in estimating potential impacts. Nevertheless, a more realistic estimate of the impact would probably lie in-between the two types of multiplier. As suggested by Oosterhaven *et al*. (1986): "these two multipliers (type I and type II) may be considered as upper and lower bounds on the true indirect effect of an increase in final demand; a realistic estimate generally lies roughly halfway between them".

2.1.1.5. Applications of Input-Output Analysis

I-O analysis has been applied in several ways and different fields. The three most relevant examples that provided interesting insights on the context of this thesis are investigated here. One application uses a standard I-O approach to estimate the impacts of freight transport policies on the economy. The second compares the results of the economic impacts of resource supply constraint using the supply driven I-O and the supply constrained model. The last employs the supply constrained I-O to analyse the impacts of peak oil.

Seetharaman, *et al*. (2003) measured the overall impacts of a freight policy on the economy, as reflected in the increase in output due to efficiency improvements and in the employment it generates. Their study assessed the economic benefits of the 2020 Regional Transportation Plan (RTP) in the Chicago Six County Region. The RTP used a travel demand forecasting model to estimate the savings in travel time, fuel and trips. These savings were translated into a decrease in labour and fuel costs and then converted to dollar values using average values and estimates. The reduction in labour and fuel costs is then equal to the change in the production cost of the motor freight sector, or output (demand) of the motor freight industry.

The increase in demand/output was fed into a standard I-O model, using IMPLAN. The results for this case study show that a reduction of just over 3% in the cost of truck freight transportation led to an overall growth of about $700 million in terms of the regional economic output, and generated nearly 7000 jobs annually on completion. The authors regarded the results as conservative because they excluded potential long-term benefits and used only delay savings as the influencing factor for the cost reduction.

This study highlighted the possibility of using I-O analysis as an economic impact method for freight transport policies. It also showed that improvements in freight movements not only benefit the freight industry, but the entire economy. The results showed that approximately half of the total economic benefits of the RTP were in other industries.

The other example studied was Davis and Salkin (1984). They analysed alternative I-O models to be used when the total output of a particular sector of the economy is constrained. They specifically applied the supply driven I-O (sales coefficient) and the supply constrained I-O (purchase coefficient) models to estimate impacts on the Kern County's economy. The constraint analysed by the authors was a hypothetical curtailment of the water supply to the County's agricultural activities.

Davis and Salkin paper showed very interesting results comparing the two approaches. They also discussed the circumstances under which each alternative might be appropriately considered. The results showed that the sales coefficient model presented values of impacts about 9 times smaller than the purchase coefficient model when analysing an open model. For the model closed with respect to households the total impacts of the sale coefficient was 41%

smaller than the purchase coefficient model. Another conclusion was that for most cases the purchase coefficient model is the most attractive approach, given its assumptions.

The final example investigated is Kerschner and Hubacek (2009). They assessed the economic impacts of Peak Oil on Japan, Chile and the UK economies, using the supply constrained I-O model. The authors concluded that the supply-constrained model proved to be well suited to analyse the quantity dimension of Peak Oil. They subjected a sudden 10% reduction on the output of the oil sectors for the three economies. Relative to total value added (excluding the oil sectors)[2], additional reductions of 0.17%, 0.028% and 0.056% in output for the UK, Japan and Chile economies, respectively, were shown. The results demonstrated which sectors are the most vulnerable to oil supply constraints in the three economies. The most affected industries in all countries include transportation, electricity production and financial and trade services.

Kerschner and Hubacek (2009) highlighted the fact that input–output analysis is frequently criticised for its constant production coefficients, but that for their paper it was a virtue. This is because the study evaluated the short-run effects of oil supply shocks.

2.2. Multi-Regional Input Output Models

The traditional analytical framework of I-O models is designed to assess the interactions between sectors of the economy. This framework, if extended, can also model more than one locality. The extension to produce an accurate Inter-Regional Input-Output (IRIO) model or even a Multi-Regional Input-Output model (MRIO) model requires an enormous amount of data, proportional to the number of sectors and regions of the desired model (Miller and Blair, 2009). The difference between the IRIO and the MRIO is that the IRIO specifies how much each region buys from and sells to all the other regions, while the MRIO estimates the trade among the sectors of each region. The development of an IRIO requires a complete IRIO tableau, a precise statistical system, a large-scale investigation of the trade of each region and sector with all other regions and sectors. Therefore, the reliability of the data is not guaranteed

[2] The effects on value added for the UK were much larger than Japan and Chile because the UK is a net-oil exporter, while the other two countries are net-oil importers. Yet, relative reductions in final demands are much higher for Japan and Chile than they are for the UK.

because of the high likelihood of error associated with such high data needs and balancing processes (Liang *et al.*, 2007). The literature indicates very few cases in which a complete IRIO was created, for instance Japan. The data collection to produce an IRIO or a MRIO would have to incorporate specific characteristics of the region, the imports and exports and the trade among the regions and sectors. Hence, a full survey of firms to gather all this information is almost prohibitive, and only a few countries have done it. Nevertheless, partial survey and non-survey methods have been developed to reduce the amount of required data to produce MRIO models. The next sub-sections describe these methods.

2.2.1. Partial Survey Methods

The most common partial survey or hybrid method to produce a MRIO is the 'RAS' approach (a biproportional technique). Other common methods are the column-coefficient model, the row coefficient model and the gravity model approach. Partial survey methods combine mathematical procedures with available data, which can be obtained by surveys, observations, projections, expert opinion or alternative means. The 'RAS' technique is a powerful tool that can be used to not only regionalize I-O models, but also to update Input-Output tables. Biproportional techniques have been used since 1941 (Leontief) and have evolved substantially since then (Lahr and de Mesnard, 2004).

The basic idea of 'RAS' for the updating problem is that starting from an I-O table of coefficients, A_{ij}^{0}, it is possible to calculate, through an iterative process, the table of coefficients for the year of interest, A_{ij}^{1}. The name 'RAS' comes from the fact that A_{ij}^{1} is calculated by pre- and post-multiplying A_{ij}^{0} by the diagonal[3] matrix of elements modifying rows, $\hat{R}_i$ and the diagonal matrix of column modifiers, $\hat{S}_j$, as in Equation 2.18. Observe that the number in parenthesis after the matrix indicates the iteration, thus $A_{ij}(2)$, refers to the second interation of the I-O table of coefficients.

$$A_{ij}(2) = \hat{R}_i A_{ij}^{0} \hat{S}_j \tag{2.18}$$

[3] A square matrix in which the entries outside the main diagonal (↘) are all zero and the diagonal entries may be non-zero or zero.

To undertake an 'RAS' updating it is necessary to know three vectors for the year of interest: the total outputs of each industry (X_j^1), the total purchases by j from the payment sectors (v_j^1), and the total sales of sector i to final demand (u_i^1). The non-negative matrix, Z is adjusted until its column sums and row sums equal u_i^1 and v_j^1 , respectively. To illustrate, consider the matrix Z , where X_j is the vector of column totals. From this matrix we can obtain its matrix of coefficients, A_{ij}^0 , where $Z = A_{ij}^0 X_j$. The matrix of coefficients A_{ij}^0 is multiplied by the row of target column totals, X_j^1 to obtain the matrix $Z(1)$ (Equation 2.19). The row totals of this matrix are represented in the vector u_i . The ratio of u_i^1 to u_i is the multiplier R_i (Equation 2.20a). Multiplying R_i and A_{ij}^0, we can obtain a new $A_{ij}(1)$ (Equation 2.20b). A row vector v_j of column totals is obtained and used to calculate the multiplier S_j (Equation 2.20c). $A_{ij}(1)$ and S_j are then multiplied as shown in Equation 2.20d. If $A_{ij}(1)$ in Equation 2.20d is substituted by $\hat{R}_i A_{ij}^0$ as in Equation 2.20b, we then obtain 'RAS' as in Equation 2.18.

$$Z(1) = A_{ij}^0 X_j^1 \tag{2.19}$$

$$R_i = u_i^1 / u_i \tag{2.20a}$$

$$A_{ij}(1) = \hat{R}_i A_{ij}^0 \tag{2.20b}$$

$$S_j = v_j^1 / v_j \tag{2.20c}$$

$$A_{ij}(2) = A_{ij}(1)\hat{S}_j \tag{2.20d}$$

$$A_{ij}(2) = \hat{R}_i A_{ij}^0 \hat{S}_j \tag{2.18}$$

where $u_i = \sum_j z_{ij}$ and $v_j = \sum_i z_{ij}$.

The iterative process in Equations 2.20a-d continues until the conditions $u_i = u_i^1$ and $v_j = v_j^1$ are me, i.e. the iterative process finishes when the column sums and row sums of Z is equal u_i^1 and v_j^1. At the end of the process (n iterations), the matrix $A_{ij}(n)$ is assumed to be the best estimate of the true posterior matrix A_{ij}^1.

Analogously, from a national table of input coefficients A_{ij}^n and the obtained regional values of X_j^r, u_i^r and v_j^r it is possible to estimate A_{ij}^r, where the superscripts n and r indicate the nation and region respectively. When possible to obtain other reliable exogenous information, the RAS procedure can generate even more accurate results, for both updating and regionalizing problems.

2.2.2. Non-Survey Methods

In cases in which it is not possible to obtain the required exogenous data to employ a partial survey method, it is still possible to regionalize I-O models, through non-survey techniques. The prevalent non-survey methods are the location quotients, such as the simple Location Quotient (LQ), the Cross-Industry Location Quotient (CILQ), Purchase-Only Location Quotient (POLQ), among others (Miller and Blair, 2009). All location quotient approaches are derived from the simple location quotient, which measures the relative importance of an industry in a region to its importance for the nation, in terms of production output, employment or other economic activity indicator (Jensen *et al.*, 1979). Alternative non-survey techniques are the regional supply percentage (Nazara *et al.*, 2003) and others can be found in Jensen *et al*. (1979). Among the non-survey techniques (LQ and CILQ) generally produce the best results, and are further explained in the next subsections.

2.2.2.1. Location Quotients

A simple location quotient (LQ_i^r) refers to the proportion of region r's total output that is contributed by sector i (x_i^r / x^r), divided by the proportion of total national output that is contributed by sector i, (x_i^n / x^n). Instead of using total output as a way of analysing its contribution, it is possible to use other economic activity indicators, with employment being the one most commonly adopted. In its mathematical form, the LQ of industry i in region r is calculated for the total output and employment as showed in Equation 2.21.

$$LQ_i^r = \left(\frac{x_i^r / x^r}{x_i^n / x^n} \right) = \left(\frac{EQ_i^r}{EQ_i^n} \right) = \left(\frac{FTE_i^r \,/\, FTE^r}{FTE_i^n \,/\, FTE^n} \right) \tag{2.21}$$

where:

EQ_i^n = national Employment Quotient of sector i;

EQ_i^r = regional Employment Quotient of sector i;

FTE^r = total of full-time employees in region r;

FTE^n = total of full-time employees in the nation;

FTE_i^r = number of full-time employees of industry i in region r; and

FTE_i^n = number of full-time employees of industry i in the nation.

Depending on the LQ value, two possible interpretations can be derived. If industry i is less concentrated in the region than in the nation (LQ_i^r <1), it is seen as less capable of satisfying regional demand for its output. Consequently, its regional direct input coefficients (a_{ij}^r) are created by reducing the national coefficients (a_{ij}^n), by multiplying them by LQ_i^r. However, if industry i is more concentrated, or localized, in region r than in the nation (LQ_i^r >1), it is assumed that the national input coefficients from industry i apply to the region. Hence, the regional surplus produced by i will be exported to the rest of the nation (Miller and Blair, 2009). For instance, if LQ_i^r = (0.02/0.01)= 2, sector i's output represents 2% of all regional gross output while, at the national level, sector i's output represents only 1% of the total national output. The Equation 2.22 summarizes how to calculate the regional technical coefficients, a_{ij}^r .

$$a_{ij}^r = \begin{cases} (LQ_i^r) \cdot a_{ij}^n & if \quad LQ_i^r < 1 \\ a_{ij}^n & if \quad LQ_i^r \geq 1 \end{cases} \tag{2.22}$$

The final demand regional coefficients c_{if}^{r} are estimated in the same manner. Values of c_{if}^{r} reflect purchases of regionally produced output i by the regional final demand sector f. The final demand sectors typically comprise private consumption expenditures, government (local, regional or/and national) expenditures, gross investments, stock variations and exports (both international and interregional). Final demand regional coefficients are calculated as described in Equation 2.23, while Equation 2.24 expresses the calculation of the estimated regional output of industry i ($\tilde{x}_i^r$), which can be compared to the actual regional output x_i^r.

$$c_{if}^{r} = \begin{cases} (LQ_i^r)\cdot c_{if}^{n} & if \quad LQ_i^r < 1 \\ c_{if}^{n} & if \quad LQ_i^r \geq 1 \end{cases} \tag{2.23}$$

$$\tilde{x}_i^r = \sum_j a_{ij}^r x_j^r + \sum_f c_{if}^r y_f^r \tag{2.24}$$

where:

c_{if}^{n} = ratio between y_{if} and y_f (y_{if} / y_f);

c_{if}^{r} = estimated regional final-demand purchase coefficient of regional final-demand sector f from industry i;

$\tilde{x}_i^r$ = estimated regional output of sector i;

y_f^r = total national purchases of final-demand sector y;

y_{if} = national sales of industry i to final-demand sector y; and

y_f = total national purchases of final-demand sector y.

The value of x_i^r can be obtained by using available statistical data. The most commonly used are the Gross Domestic Product and Gross Regional Product by sector, GDP_i and GRP_i^r respectively. Hence, regional output is the region's GRP divided by the nation's GDP and multiplied by the national output ($x_i^r = GDP_i\ x_i^n / GRP_i^r$).

Once the processing of all industries and final demand is finished, a consistency check must be conducted. If the regional industry output obtained using the above coefficients exceed the actual output for some industries, coefficients have to be balanced to ensure that they do not overestimate the regional output of each sector. The notion of a balancing method is simply that if estimated coefficients generate an estimated regional output for sector i ($\tilde{x}_i^r$) larger than the actual regional output ($\tilde{x}_i^r > x_i^r$), then $\tilde{x}_i^r$ should be uniformly reduced, by multiplying it by a ratio of estimated to actual regional output, D_i^r (Equation 2.25).

$$D_i^r = x_i^r / \tilde{x}_i^r \tag{2.25}$$

Equation 2.26 shows that D_i^r is used to balance the regional coefficients that are less than one. This operation generates a balanced regional direct input coefficient ($\bar{a}_{ij}^r$).

$$\bar{a}_{ij}^r = \begin{cases} R_i^r \cdot a_{ij}^r & \text{if } D_i^r < 1 \\ a_{ij}^r & \text{if } D_i^r > 1 \end{cases} \tag{2.26}$$

The Location Quotient assumes that the national technology[4] is uniform across regions and regional input coefficients vary only because of variations in regional capacities to satisfy demand. The technique also assumes that the mix of products for each industry is the same across all regions. This assumption is reasonable for some production style and places, whereas it may not be for others. Hence, the level of aggregation of the sectors can be an important characteristic of the model. For small countries and economies, it is observed that there is high similarity in regions' production characteristics. Therefore, assumptions of the same industrial mix and production function are fairly satisfactory, but it is usually seen as a problem for large and diversified countries and economies.

Once all monetary flows for each industry and region are estimated, it is necessary to regionalize the final payments. The value-added coefficients are assumed to be the same as the national value-added coefficients, except imports. The residual of these coefficients is the import coefficient, which includes domestic and international.

[4] Technology used nationwide for the production of goods and services, which relates the amount of inputs used to produce a certain output.

2.2.2.2. Cross Industry Location Quotient

The CILQ is a variation of the simple location quotient that takes into account the relative importance of the purchasing industry as well as the selling industry (Jensen *et al.*, 1979). CILQ offers the advantage of allowing cell-by-cell adjustments within the matrix A^n rather than uniform adjustments along each row (Miller and Blair, 1985). The differentiation is made by dividing LQ_i^r for LQ_j^r, as shown in Equation 2.27.

$$CILQ_{ij}^r = \left(\frac{X_i^r / X_i^n}{X_j^r / X_j^n} \right) = LQ_i^r \big/ LQ_j^r \tag{2.27}$$

The reasoning behind this approach is that if industry j is under-represented in a particular region, a small industry i will be enough to fulfil its demands. Although under-represented, industry i may be export-oriented, as long as it is less under-represented than industry j. In other words, if industry i is larger than industry j in a certain region (CIQ_{ij}^r >1), then all of j's need of input i can be supplied from within the region. Likewise, if industry i is more concentrated in region r than industry j, some of j's needs for i inputs will have to be imported (Miller and Blair, 2009). Thus, the CILQ approach requires more adjustments than the LQ, because it estimates one indicator per cell, whereas LQ estimates one per industry, as depicted in Equation 2.28.

$$\begin{gathered} a_{ij}^r = \begin{cases} (CILQ_{ij}^r) \cdot a_{ij}^n & if \quad CILQ_{ij}^r < 1 \\ a_{ij}^n & if \quad CILQ_{ij}^r \geq 1 \end{cases} \text{for } i \neq j \\ a_{ij}^r = \begin{cases} (LQ_i^r) \cdot a_{ij}^n & if \quad LQ_i^r < 1 \\ a_{ij}^n & if \quad LQ_i^r \geq 1 \end{cases} \text{for } i = j \end{gathered} \tag{2.28}$$

2.3. Freight Transport

The underlying principle of transport analysis and forecasting is that the spatial separation of human activities creates the need for people and goods to travel (Wegener and Fürst, 1999). In particular, freight transport involves the movement of goods from one location to another. The types of goods transported vary widely, including agricultural and manufacturing products, fuels, mail, etc. Freight can be carried by several modes of transport, including road, rail, water, pipelines and air. Freight transport and its ancillary activities include loading, unloading, warehousing, inventory control, processing, linehaul, packing, information and documents transfers, customs clearance, quarantine, intermodal transfer, etc. Figure 2.1 shows the goods movement process, normally represented in terms of phases/stages through which the freight passes. As illustrated in Figure 2.1, freight goes through a series of activities, in which each activity has a participant involved. Also, different types of modes and different types of distribution processes are represented. The demand for freight transport varies from one country to another, depending on its historical, geographical and infrastructure characteristics, and depends mainly on the production and consumption of goods.

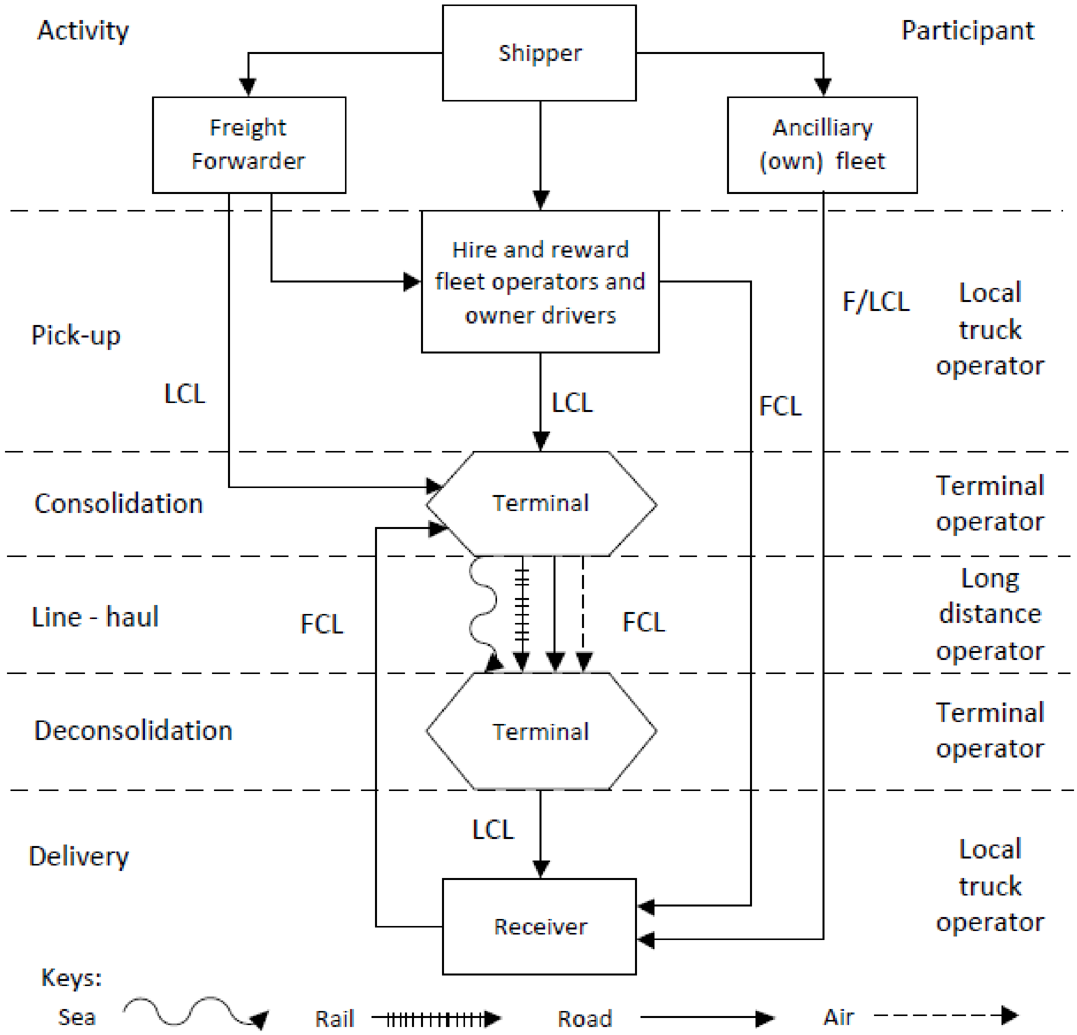

Figure 2.1: The goods movement process[5]

Source: Modified from Ogden(1992)

Nolan (2005) makes a parallel between the histories of goods transportation and of human development, establishing how more efficient modes of freight transport have encouraged trade and exploitation of the principle of comparative advantage[6] at every stage in human history. According to Nolan, societies have invested in transportation infrastructure for reasons other than strictly to facilitate trade and commerce, usually motivated by wars and other military and

[5] FCL stands for full container load (ship) or full carload (rail) and LCL means less than container load (ship) or less than carload (rail), for truck transport it is used FTL – full truckload and LTL - less than truckload. For general purposes, in the figure it is used FCL and LTL for all modes of transport.

[6] A situation in which a party (country, individual, company or region) can produce a good or service at a lower opportunity cost than a competitor, normally associated with gains resulting from international trade.

strategic objectives. Later, a clear contribution of transportation investment to economic growth and productivity was observed. In the 1980s the changes in transportation and logistics, and especially in the trucking industry, came about as a consequence of trucking deregulation and partial rail deregulation (ICF Consulting and HLB Decision Economics, 2002b).

The deregulation and elimination of regulatory barriers to entry permitted the rise of efficient truckload operations, substituting the less-than-truckload (LTL) firms. The changes in the system led to declines in transport rates and to the emergence of a new, responsive, and flexible trucking industry. This industry has become more sophisticated in its operations and has made possible much of the improvement in the logistics system and supply chain management that has subsequently evolved, such as just-in time (JIT) deliveries (ICF Consulting and HLB Decision Economics, 2002b).

Thus, investments in freight transportation, supply chain management and logistics system directly impact on transport costs and economic growth. This relationship is caused by the intrinsic link between freight transport and economics. Hence, a review of the economics of freight transport, explaining how and why developments in freight transport affect the economy, as well as some basic transport economics concepts is presented. Transport models are based on the assumptions and techniques developed in transport economics. So, the following subsection describes current available models and techniques used to model freight transport.

2.3.1. Transport and Economics

From the economics perspective, freight transport is considered as a derived demand, meaning that transport itself is not necessary unless required, so a demand for a unit of transportation is "derived from a supply at an origin and a demand at a destination, a concept better known as spatial complementarity" (Rodrigue, 2006). Thus, transport is not a good in itself, except for some cases of passenger's transport (Mokhtarian and Salomon, 2001). Normally, transport is subject to the same economic principles that apply to the supply and demand of others goods.

Transport economics embraces both micro and macro economics. Although they seem to be quite distinct, it is often hard to separate them. Micro and macroeconomics complement and relate to each other, especially in the transportation context. Traditional transport economics has a greater focus on the microeconomic side: the supply and demand of transport; interactions between firms and individual consumers; economic evaluation of transportation projects; transportation costs and pricing; consumer behaviour and so on. Conversely, economics studies have recently paid more attention to the macroeconomics side of transport, such as how it affects the economy through GDP; the relationship between infrastructure development, national economy and national defence; influences on natural resources in terms of land development, energy use, pollution and other environmental impacts; the influences on human resources in terms of travel opportunities (welfare), employment and safety; government interventions by means of regulation, taxation and subsidies, etc.

On the freight transport demand matter, the demand for freight is normally associated with other factors such as capital, inputs, materials, labour, the size of firms, the modes of transport, the types of carriers and time-sensitive (just in time or perishable) goods. Many times freight is correlated to the variations in GDP (the more an economic system produces and consumes, the more freight is moved (Rodrigue, 2006)) and to the nature of economy (the share of the primary, secondary and tertiary sectors, contributes to the level of freight intensity (Bennathan, Fraser and Thompson, 1992)). For instance, Figure 2.2 illustrates how investments in transportation infrastructure can increase incomes by using resources more effectively and lead to economic growth. Freight transportation improvements that can reduce the costs of transport are critical to economic expansion because goods movements are a factor input in the production process (ICF Consulting and HLB Decision Economics, 2002a). Like the other inputs in the production process, such as labour and capital, transportation costs affect directly the price of goods and services and the profits of producers. Consequently, investments that reduce the cost of moving goods also assist in increasing and sustaining economic growth. Therefore, the efficiency and reliability of the freight transportation system affects economic productivity, which is the most important factor to determine economic performance (ICF Consulting and HLB Decision Economics, 2002a).

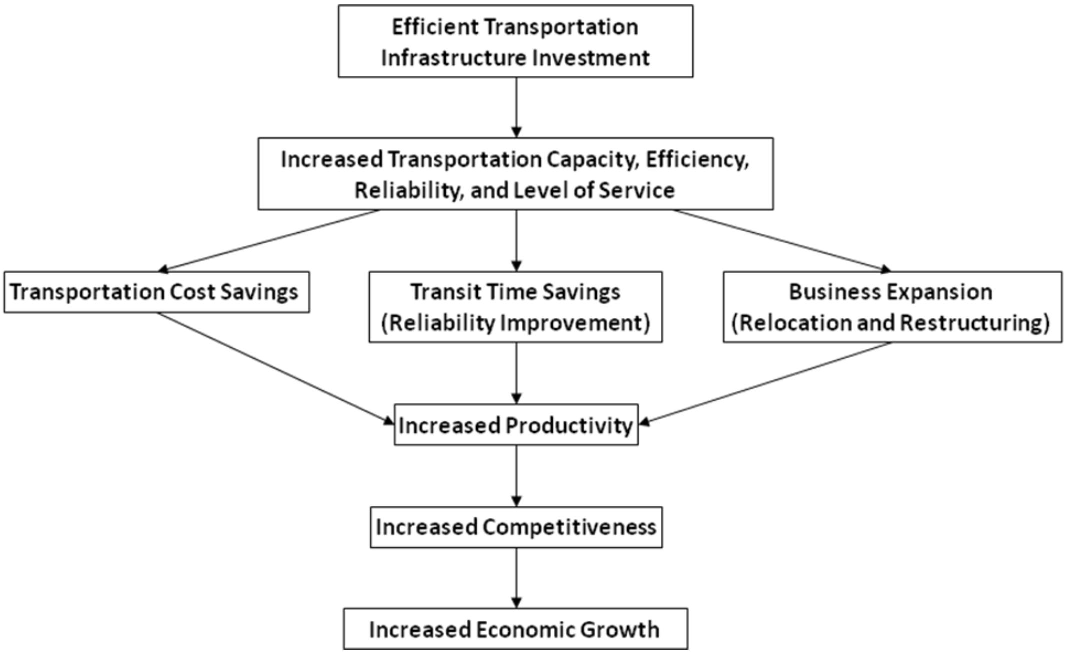

Figure 2.2: Transportation and the economy

Source: (ICF Consulting and HLB Decision Economics, 2002a)

In other words, Figure 2.2 demonstrate that improvements in freight transportation systems reduce delivery costs, support faster and more reliable transportation and a better level of service. As a consequence, companies have gains in many aspects: they reduce labour costs (with drivers), reduce the amount of trips needed and increase the freight efficiency of trips leading to smaller vehicle fleet; reduce the costs with maintenance and operation, improve transportation reliability, reduce the needs for big inventories, allow for better supply chain management and so on. The reductions of costs improve the competitiveness of enterprises with access to the improved freight system. The expansion in demand can generate economies of scale and improve productivity, because enterprises benefit from these market opportunities, which in turn induces another round of costs reductions (ICF Consulting and HLB Decision Economics, 2002a). The improvements in manufacturing and distribution productivity affect the economy, added to an increase in production input and led to real economic growth. Economic growth in developed countries is associated with globalisation characterised by global markets and global sourcing (Schleicher-Tappeser et al., 1998). As a result transport distances and demands increase.

In recent years there has been considerable interest in uncoupling freight transport and economic growth, especially in the European Union. Decoupling or uncoupling implies breaking the links between economic development and negative environmental externalities associated with increased transport (OECD, 2006). For example, through the use of a good logistical decision making framework and the encouragement of the development of regional production clusters, it is possible to reduce transportation but not reduce economic growth. Although research has tried to quantify, monitor and increase the amount of decoupling (Pastowski, 1997, Schleicher-Tappeser *et al.*, 1998, Ballingall *et al.*, 2003, Kveiborg and Fosgerau, 2007, McKinnon, 2007), the results have been negligible. The inability to analyse and enhance decoupling are related to inconsistency of the issue definition, lack of specific data to link causes and consequences, and the fact that most of the observed uncoupling has not been planned but happened as consequence of other economic factors, such as increases in fuel prices. Decoupling is an important matter because it is crucial to reduce the impacts of freight transport without creating negative effects to the economy. However, the net environmental benefits of uncoupling cannot be precisely measured but are likely to be modest (McKinnon, 2007).

Figure 2.3 (top) is a basic illustration of the nature of freight transport demand. It shows the level of the decisions made by the companies in the demand for freight transport, in the order that the decisions happen. Each decision takes account of the decisions made in the previous levels and the consequences at all subsequent levels. Combes (2010) proposed four decision levels: the location of production installations, the supply decisions, the logistical organisation of supply chains and the demand for transport of shipments. Figure 2.3 also shows a graphic representation of the decisions and where they are observed.

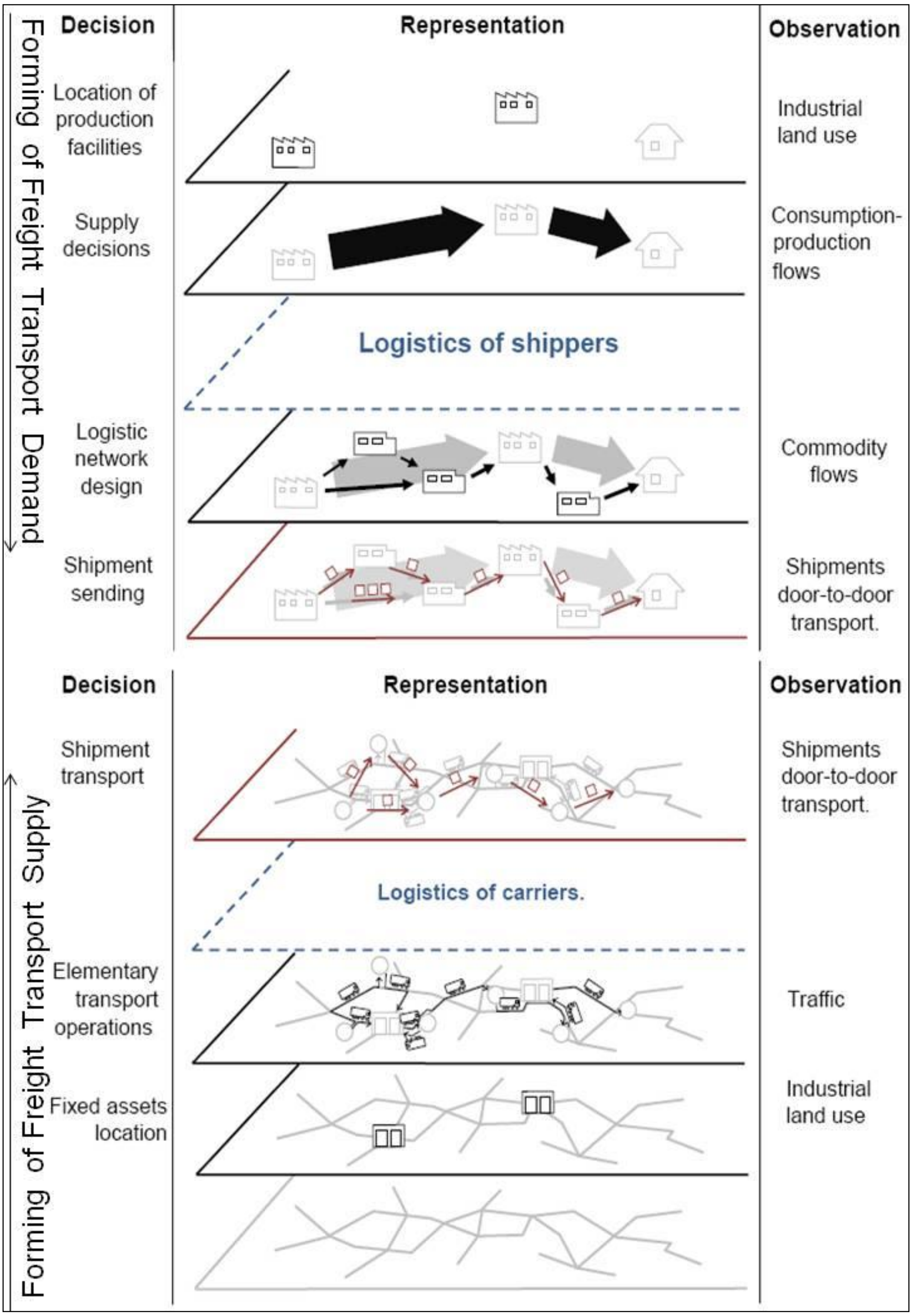

Figure 2.3: Representation of freight transport demand (top) and supply (bottom)

Source: (Combes, 2010)

On the supply side, freight transport is heavily influenced by the costs involved (Button, 1993), as well as the capacity of the network to support traffic for the different modes over a period of time. The existing economies of scale in freight transport contribute to the characteristics of transport operations which form the freight transport offer. Thus, the different decisions inherent in the formation of the transport service were divided according to whether they concern the location of fixed resources, elementary transport operations, or transport of shipments (Combes, 2010). Figure 2.3 (bottom) depicts the freight transport supply, in which the different decision levels are shown by different layers. The left column indicates the decisions corresponding to the layers appearing in the middle column, and the right column indicates where the corresponding decisions are evident.

Both supply and demand of transport are functions of the transport cost, which comprise fixed (equipment, license fees/taxes, insurance, management/overhead etc) and variable costs (maintenance/repair, fuel, labour, tolls, tires, etc) (Dooley *et al.*, 1988; Casavant, 1993; Faucett and Associates, 1991). Travel time is one of the largest transport costs and the term generalized travel cost combines travel time and financial costs (Litman, 2009). The generalized travel cost is key to transport modelling as it indicates how flows are distributed throughout the network and is useful in understanding shipper's behaviour. Thus, in this thesis travel cost is defined as the travel time on link a of mode m, which is higher than the travel time for free flow due to additional operating costs of congestion. The cost term is also used interchangeably with the BPR (Bureau of Public Roads) term because the cost unit is based on BPR cost functions, Equation 2.29. BPR function is one of the most commonly used cost-flow functions and can be used to predict vehicles speed and/or travel time.

$$t = t_0 \left[1 + \alpha \left(\frac{V}{C} \right)^{\beta} \right] + t_t \qquad (2.29)$$

where:

t = predicted travel time over the road segment;

t_0 = travel time at the free-flow speed;

α = link specific calibration parameter;

β = link specific calibration parameter;

V = traffic volume;

C = link capacity; and

t_t = the toll, converted to an equivalent travel time.

The parameter α is the ratio of free flow speed to the speed at capacity, and the more sudden the onset of congestion the higher its value, while β indicates how abruptly the curve drops from the free-flow speed, and the higher its value the higher the slope. Traditionally, α and β have been adopted as 0.15 and 4.0, respectively (HRB, 1965). However, Dowling *et al*. (1997) proposes an update to the values of α to 0.05 for signalized facilities and 0.20 for all other facilities and of β to 10, as the delays increase more steeply for large traffic volumes. If the value of β is too high and/or α is too low for a highly underutilized road ($V/C << 1$) then the equilibrium model would degenerate to an all-or-nothing assignment and the travel time would equal the free-flow travel time.

Another important part of freight transport economics, that explains the response behaviour of the supply and demand curves due to changes in different factors, is the elasticity of freight transport. Elasticity gives information on the slope and location of the supply and demand curves, it measures a variable sensitivity to a change in another variable or the ratio of the percentage change in one variable to the percentage change in another variable[7]. The slope of the curves, i.e. how the quantity supplied (or demanded) changes according to variations of costs, is the cost elasticity. The elasticity is also used to determine the equilibrium point between supply and demand.

Variations of transport costs have different consequences for different modes, but transport demand and supply are typically inelastic, particularly for economic sectors where freight costs are a small component of the total production costs. However, some studies have found price elasticity of freight transport to be elastic, between -1 and -1.5, for various commodity groups (Friedlaender and Spady, 1980, Graham and Glaister, 2002a, Clark *et al.*, 2005). Thus, depending on what type of analysis is made the elasticity can take different values. If considering the cross elasticity of supply of road freight transport related to fuel prices, de Castro (2003) obtained an average value of -0.29 and the range to be between -0.1 and -0.7

[7] Elasticity is expressed in absolute value, then, if the elasticity is greater than one demand is said to be elastic; between zero and one demand is inelastic and if it equals one, demand is unit-elastic. An elastic variable is one which responds well to small changes in the other parameter and an inelastic variable describes one which does not change much in response to changes in other parameters. The closer to zero is the elasticity, the more inelastic is that variable.

which is compatible with other studies (Oum *et al.*, 1992, Bailly, 1999, Beuthe *et al.*, 2001, Graham and Glaister, 2002a, Graham and Glaister, 2002b, Goodwin *et al.*, 2004, Graham and Glaister, 2004). Regarding price elasticity of freight, Table 2.2 displays the values range for several commodities types.

Table 2.2: Demand elasticities of truck freight transport

Commodities	**Range surveyed**	**Most likely range**	**Elastic or inelastic**	**Studies analyzed**
Aggregate commodities	-1.34 to -0.05	-1.10 to -0.70	Inelastic	1
Assembled automobiles	-0.67 to -0.52	-0.70 to -0.50	Inelastic	1
Chemicals	-2.31 to -0.98	-1.90 to -1.00	Elastic	2
Corn, wheat, etc.	-0.99 to -0.73	-1.00 to -0.70	Inelastic	2
Foods	-1.54 to -0.32	-1.30 to -0.50	Inelastic	3
Lumber, wood, etc.	-1.55 to -0.14	-0.60 to -0.10	Inelastic	3
Machinery	-1.23 to -0.04	-1.20 to -0.10	Inelastic	3
Primary metals and metallic products	-1.36 to -0.18	-1.10 to -0.30	Inelastic	3
Paper, plastic and rubber products	-2.97 to -1.05	-3.00 to -1.10	Elastic	2
Refined petroleum products	-0.66 to -0.52	-0.70 to -0.50	Inelastic	3
Stone, clay and glass products	-2.17 to -1.03	-2.20 to -1.00	Elastic	2
Textiles	-0.77 to -0.43	-0.80 to -0.40	Inelastic	1

Source: (Clark *et al.*, 2005)

Table 2.2 illustrates that freight transport elasticities can have different estimates, and that most (9 out of 12) analysed commodities were more in the range of inelastic than elastic. This variation is expected, since demand for transportation should not respond to changes in prices identically for all commodities. Similarly, the responsiveness to price changes should not be the same for all firms shipping the commodity, as size, location, and characteristics of the firms diverge. Complementary, different studies analyze behaviour in different markets. The above studies were conducted in the USA and Canada and it is expected that similar results would be obtained for different countries. Two important parameters when analysing elasticity of freight transport are the distance of hauling and competition with other modes. According to de Castro (2003), individual operators have a higher elasticity due to smaller investments in maintenance and vehicles while bigger companies present smaller elasticity. In addition, Graham and Glaister (2002a, 2002b, 2004) demonstrate that elasticity for long term tends to be higher than for short term.

2.3.2. Freight Transport Modelling

Models are essential tools to help the decision making process and are used in all fields. Models show the relationships between the factors and how a change in one variable can affect the current and future system. In terms of transportation, the development and management of infrastructure is costly and has to be well planned and performed. Thus, forecast analysis and modelling results are crucial to provide information for many long term investments.

Freight transport models provide measurable results to support decision makers in both the public and the private sectors to make important investments on the transportation system (Lahsene *et al.*, 2006). Hence, it is crucial to integrate freight data, models and transportation planning in a holistic system, to not misjudge important variables and to not overload the models with irrelevant information. Effective freight models do not include all the details of every action that occurs in the sector. They are rather selective in what can be included. Minor details are eliminated and relevant relationships are emphasized. Turnquist (2006) presents some important characteristics of effective freight models: a) focus on producing an output that someone wants and knows how to use; b) includes the important variables that describe how the system works and represents their interactions clearly and correctly; c) operates in a way that is verifiable and understandable; and d) based on data that can be provided, so that it can be calibrated and tested. The author states that "failure to pay attention to these straightforward ideas is common and often leads the model (and modelling projects) to failure".

Freight models are not an end in themselves. They are only valuable in a planning and/or policy context to guide and support decision making (Ogden, 1992). Modellers, who normally have scientific or engineering backgrounds (Turnquist, 2006), need to keep the issue in mind when developing models for public agencies, because decisions are broad, ranging from small system improvements to strategic and macro level considerations (Meyer, 2006). Figure 2.4 shows different analysis tools according to the level of complexity of decisions, and can be used for decision making in general, including freight transport analysis. The virtue and value of models are greatly dependent on how well they represent reality, and on the availability and quality of input data for model calibration and forecasting (Meyburg and Mbwana, 2002).

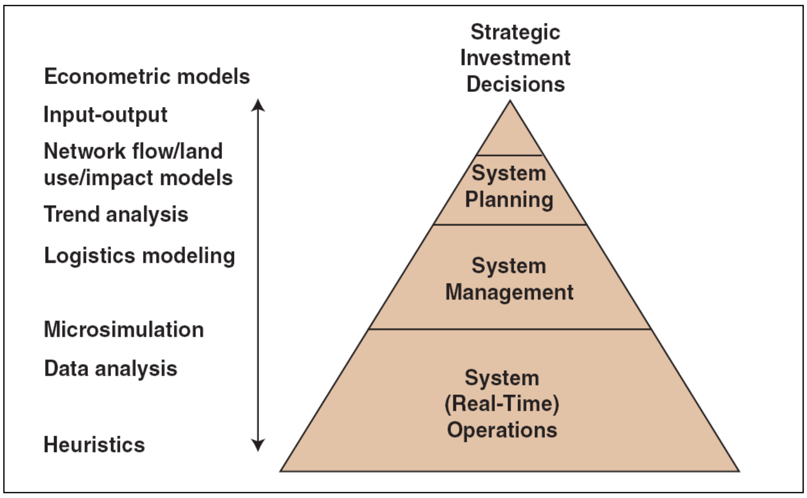

Figure 2.4: Decision making and corresponding tools

Source: Meyer, 2006

According to Lahsene et al. (2006) freight models have been built based on passenger travel modelling. Personal transportation modelling arose as a component of the process of transportation analysis established during the post-war era of economic growth (McNally, 2000). Traffic demand models started to be studied in the 1950s and the first models to be constructed were the four-step models (4SM), which are still extensively used and are the most well-known transport model. The popularity of this model relies on its logical framework, in which each step answers one important question about the transportation pattern: how many travel movements will be made, where will they go, by what mode of transport, and what route will be taken (Bates, 2008). So, the four steps are:

1. Trip generation. Predicts total trips that starts and ends in a particular area (or zone) by trip purpose, as a function of land use patterns (area of land, density, dispersion, type of use, development, etc.), household demographics (number of residents, jobs, employment density, etc.), transportation system features (distance between zones, road characteristics, facilities, transport network, etc.), and other socio-economic factors of the zone;
2. Trip distribution. Distributes trips between origins and destinations according to the characteristics of each zone and the deterrence effect of increasing cost;
3. Mode split. Computes the proportion of trips that use a particular transportation mode based on the costs of each mode; and
4. Trip assignment. Allocates trips to a route, taking account of the specific facilities of transportation networks and the utility function value for each route.

In the 1960s the 4SM was widely used and even institutionalized by the USA federal legislation. In the 1970s alternative methods started to be developed, such as multimodal planning, disaggregate travel demand forecasting, equilibrium assignment methods and others (McNally, 2000). It was in the 1970's that some attention started to be given to modelling goods transport (Button and Pearman, 1981). After that period, there was not any significant advance on freight models (Ogden, 1992) for over a decade. In the 1990's, freight analysis came back on to the policy and planning agenda and in the second millennium it has developed quite extensively in terms of modelling, forecasting and analysis. Nevertheless, most models are focused on urban freight transport and national models are still scarce; most national models share the same literature of urban modelling. Existing models are considered limited in their forecasting capacity, but give a satisfactory prediction of the present situation for a variety of planning and policy decisions (Southworth and Wigan, 2006).

Most freight transport models are still based on the same assumptions of personal travel, using the 4SM (Ortuzar and Willumsen, 1994) and estimating freight transport as a percentage of passenger trips. Table 2.3 shows the techniques used in each of the four steps of freight modelling. These traditional models are generally not an adequate approximation of freight movements, because they do not fully incorporate some important features of commodity flow and freight transport (Taniguchi and Thompson, 2002), such as: vehicles making multiple routes per day, the whole supply chain and level of service of the road network are not included. Moreover, there are fundamental differences between the movement of people and goods: the decision maker, the unit of transport, delivery patterns, animate *versus* inanimate objects, demand factors and the relationship of demand to independent variables (Ogden, 1992) differ.

As such, freight transport demand is more complex, therefore harder to predict than passenger demand. Rodrigue (2006) points out some reasons why freight transport is more challenging to assess and forecast than passenger transport: freight forwarders are the decision makers regarding route assignment and mode choice, and decisions are not necessarily based on costs; the freight transportation market is highly segmented and specialized according to the commodity being transported and each has its own behaviour and level of functional integration; measurement units of freight are different according to the good transported and this influences the way to model and forecast transport demand; freight transport costs have many components related to the different types of services that need to be managed, generating a large amount of transactions and information flows; freight transport has gradually become an internationally integrated market, in which goods and services compete in a global level; distribution centres are links between production and consumption that have transformed the geography of distribution of goods; and the value of time changed the supply chains and consequently made the freight demand and the logistical management a time-sensitive matter.

Table 2.3: Techniques used to model freight transport in a four-step approach

Step	Techniques
Generation	• Growth factor methods (based on Historical Traffic Trends or on Economic Indicators); • System Dynamics; • Regression techniques (include least square regression models - generally linear - and category or cross classification analysis); and • Generation rates (trip-based models use land use data, for example Quick Response Freight Manual[8] and commodity-based models use economic data and input-output tables).
Distribution	• Gravity Model; and • Linear programming approach.
Mode Choice	• Elasticity-based model; • Direct demand model; • Modal diversion analysis (can be aggregated or disaggregated depending on the data used and are often treated using a Multinomial Logit Model); • Micro-simulation approach (many use Monte Carlo simulation); • Neoclassical models (normally using cost functions); and • Network model (simultaneously predicting mode and route choice).
Trip Assignment	• Network model (mode and route choice together); • All-or-nothing assignment; • Incremental assignment; and • Multipath assignment.

Source: (De Jong *et al.*, 2004, Victoria and Walton, 2004)

The four-step process also has some major weaknesses even for modelling passenger transport. For instance, Openheim (1995) highlights that modelling each step separately is a primary pitfall, although steps are inter-connected, because travel demand is based in one single unifying rationale that explains and validates all its aspects jointly. Another drawback is how

[8] Cambridge Systematics Inc. (1996) Quick Response Freight Manual. Comsis Corporation, and University of Wisconsin, Milwaukee, Final Report, Federal Highway Administration.

congestion is treated. When congestion exists on the network or at the destination, travel costs are dependent on travel volumes and vice-versa, and the feedback loops in the traditional approach may generate poor results as well as be computationally inefficient. Finally, for modelling freight transport, the 4SM does not incorporate inter-industries relationships and lacks behavioural interpretation.

Nowadays, there are some specific goods transport models and most models can be classified in two groups: trip-based (TB) approach and commodity-based (CB) or goods-flow approach (Ogden, 1992). Different modelling approaches can be used on each of these groups; the most widely used are (a) variants of the 4SM, (b) direct demand models, and (c) input-output, as summarized in Table 2.4. TB and CB approaches are further detailed on the subsections below.

Table 2.4: Modelling platforms and approaches most frequently used

<table>
<tr><th colspan="2"></th><th colspan="3">Modelling Approach</th></tr>
<tr><th colspan="2"></th><th>Variations of Four-Step Model</th><th>Direct Demand Models</th><th>Input-Output Models</th></tr>
<tr><td rowspan="2">Modelling Platform</td><td>CB</td><td>Used in both urban and regional applications</td><td>Frequently used in corridor analysis</td><td>Used in regional economic development studies, rarely in urban areas, though land use-transportation models are based on I-O.</td></tr>
<tr><td>TB</td><td>Used in both urban and regional applications</td><td>Frequently used in corridor analysis</td><td>Not applicable</td></tr>
</table>

Source: (Holguín-Veras and Thorson, 2000)

2.3.2.1. Trip Based Models

The TB or vehicle-based approach normally deals with truck trips at the aggregate level (Wisetjindawat *et al.*, 2007). It estimates freight traffic flows by using indicators for the amount of goods trip generated, such as gross company area, number of employees or any other factors, excluding the amount of commodity production and consumption. One example is the model developed by Eriksson (1996), an empirical approach that distinguishes changes of demographic variables (different industrial sectors, types of trips, truck operators and origins and destinations) and variations in traffic flows over day and years. Eriksson's model also includes analysis of economic external effects, such as road pricing and changes of fuel price.

However, the model does not include any quantitative analysis, is solely based on the changes of the observed system, and is probably not good practice.

One of the limitations of the trip-based models is that they are not able to evaluate new transport systems. These models usually employ trip generation indicators that are derived from empirical data (Boerkamps *et al.*, 2000). Victoria and Walton (2004) point out two additional disadvantages of these models for Metropolitan Planning Organizations (MPOs). They indicate that TB models do not provide any basis for estimating trip end control totals, neither have they addressed trip chain patterns, nor incorporate sufficient information about commodities flows. Holguín-Veras and Thorson (2000) also point that TB models have questionable applicability to cases in which more than one transportation mode should be considered. Also, the economic and behavioural mechanisms determining freight demand are difficult to define, as mode choice and vehicle selection processes are not explicitly considered in the modelling strategy. However, TB models provide considerable advantages in terms of data usage, due to the availability of traffic counts and screen counts, which are extensively collected world-wide. Other benefits of TB models include the opportunity to model empty truck trips; the possibility of easily combining truck trips with passenger car trips for route assignment; and the increased capability of combining intelligent transportation systems data and simulations on the modelling platform.

Hence, it is widely agreed that the actual demand in freight transport is motivated by goods consumption. Some authors affirm that the primary focus of freight transport models should be the commodity flows (Garrido, 2003). Despite that, most of the literature deals primarily with TB models due to the difficulty in measuring commodity flows (Regan and Garrido, 2001). Although TB models are useful in identifying the assignment paradigms needed for the supply models, because vehicle flows are the result of logistics decisions made by the carriers. Nevertheless, CB models are more suitable for freight modelling than TB, as commodity flow is the fundamental element of freight transport distribution.

2.3.2.2. Commodity Based Models

CB or goods-flow models aim at modelling freight movements based on the level of commodity production and consumption (Wisetjindawat and Sano, 2003), normally using consumption indicators to estimate transport volumes. Consequently, it requires an additional step of converting the commodity flows to vehicle tours and sometimes such models need a vast amount of empirical data. CB models are often focused on specific aspects of freight transport (Boerkamps *et al.*, 2000).

Boerkamps and Binsbergen (1999) have developed a model namely GoodTrip, which is an applied example of a CB model. GoodTrip reflects the behavioural interactions among markets, actors, and supply chain elements of urban freight movement. They have incorporated a 4SM with logistic concepts that takes a form of a representation between a zone - based model and disaggregated logistics models. Another example is the model proposed by Maat and Visser (1996), which is a GIS (Geographic Information System) embedded routine integrating trip chain characteristic of freight transportation and allocating it to the access roads of a city. Geospatial tools are used for route simulation, which produces sequences of picking up or delivery involving the least distance, time, or cost.

Thus, CB models were developed based on the fact that the principal entity of freight transport is the movement of goods, not vehicles, therefore these models attempt to understand and model commodities: their generation, markets and logistics management (Ogden, 1992). As observed in Table 2.4, Input-Output models are an important technique used to model goods flow. Combined models are also a fine example of CB model, that has initially received attention in the middle 1970s (Cesario, 1975, Evans, 1976) and has been further extended and developed (Safwat and Magnanti, 1982, Metaxatos *et al.*, 1995, Oppenheim, 1995, Boyce and Zhang, 1997, Chang *et al.*, 2001).

2.3.2.3. Combined Models

A combined model, as the name suggests, considers many levels of travel demand modelling simultaneously. Instead of separate steps, as in the 4SM, they aim at modelling travel demand in an integrated and consistent approach. Combined models have an effective way of representing individual choices, which are correlated, through a hierarchy structure. The four steps of travel are totally and rigorously integrated, without the need to resort to heuristic feedback loops between them, as the algorithms assure a convergence to an internally consistent solution.

In particular, the values of travel costs for each of the steps are compatible with one another and travel demands are balanced, for each of the steps and from one step to another (Oppenheim, 1995). Most combined models use the input-output technique to obtain the trip generation, incorporating well inter-industry relationships by showing how one industry's output works as inputs to another industry; i.e. how the industries interact through buying and selling resources, and the strength of the relationships among industries. Additionally, the formulation of the combined models can be used for congested or uncongested networks, therefore not requiring different models or algorithms, and reducing inconsistencies of travel time caused by congestion. These characteristics of combined models indicate an increase capability of modelling in the presence of demand externalities or not, giving one jointed treatment to all levels of travel demand. Finally, the apparent complexity of the algorithms should not hide their essentially simple and systematic structure (Oppenheim, 1995).

Combined models are well described in various papers by Boyce and in Oppenheim (1995). Evans (1976) was among the first who studied the mathematical formulation of the combined distribution/assignment problem. Her formulation for the doubly-constrained combined model is described in Equations 2.30 and 2.31.

$$\min z[x,q] = \sum_a \int_0^{x_a} t_a^v(\varpi)d\varpi + \frac{1}{\zeta}\sum_a (q_{rs}\ln q_{rs} - q_{rs}) \tag{2.30}$$

Subject to:

$$\begin{aligned} &\sum_k f_k^{rs} = q_{rs} &&\forall r,s &&(u_{rs})\\ &\sum_s q_{rs} = O_r &&\forall r &&(\mu_r)\\ &\sum_r q_{rs} = D_s &&\forall s &&(\lambda_s)\\ &f_k^{rs} \geq 0 &&\forall k,r,s && \end{aligned} \tag{2.31}$$

where:

x_a = flow on link *a;*

x = the set of link flows;

q_{rs} = flow between origin *r* and destination *s*;

q = the set of O-D flows;

O_r = trips originated from r;

D_s = trips destined to s;

t_a^v = travel time on link a and road type v;

f_k^{rs} = flow on path k between O-D pair r-s; and

ζ = dispersion parameter (the larger the value, the greater the dispersion in O-D flows would be).

This approach is formulated as an optimization problem in which the User-Optimal Route Choice is at the core of travel forecasting and Mode Choice as well as Origin-Destination Choice is a function of the flow-dependent travel times determined by auto route choices. This approach brings the advantages of being internally consistent (parameters are simultaneously estimated so estimated flows are more behaviourally and empirically realistic), and being based on convergent algorithms, which generate more meaningful levels of accuracy. Equation 2.30 represents the basic mathematical formulation for the optimization problem while Equation 2.31 presents the set of restrictions that the model is subjected to.

The first three constraints of Equation 2.31 are for flow conservation, and the variables in parentheses to the right of the constraint equations are associated dual variables. The last constraint is to maintain flow non-negativity. Evans proved that this optimization problem is convex, is equivalent to the combined trip distribution and traffic assignment problem, and has a unique solution with respect to link flow x_a and O-D flow q_{rs}. Observe that to calculate t_a^v, the BPR cost function, as stated in Equation 2.29 is used and adapted to account for road type information, as in Equation 2.32.

$$t_a{}^v = t_{0a}{}^v \cdot \left(1 + \alpha^v \cdot \left(\frac{f_a^v}{C_a^v} \right)^{\beta^v} \right) + tt_a{}^v \tag{2.32}$$

where:

$t_{0a}{}^v$ = free flow travel time on link a road type v;

$f_a{}^v$ = flow on link a road type v;

$C_a{}^v$ = capacity of link a road type v;

$\alpha^v, \beta^v =$ link parameters that are estimated to fit the relationship to the observed traffic flow characteristics for a given road type v;

$tt_a^v =$ equivalent travel time applied to toll roads on link a road type v.

The first term in the objective function (Equation 2.30) is the same as that for the user equilibrium (UE) assignment model, and its minimization ensures that in the final solution, link flows satisfy the user equilibrium conditions. The second term in the equation represents the entropy model, which was originally applied to urban and regional planning problems by Wilson (1970). Letting each unique combination of travel decisions made by all the users in the system be a state of the system, then any set of O-D flow pattern q is an aggregation of such states which satisfy flow conservation constraints. It is assumed in the entropy model that all states are equally likely to occur, and thus the distribution pattern q that is most likely to occur is the one that contains the greatest number of states that satisfy the constraints. To maximize the number of states associated with a particular O-D distribution N(q) is the same as to maximize its logarithm, given by:

$$\max \ln N(q) = \ln \frac{Q!}{\prod_{rs} q_{rs}} = \ln Q! - \sum_{rs} \ln q_{rs}! \tag{2.33}$$

where Q is the total number of trips in the system (i.e., Q = $\sum_{rs} q_{rs}$). Since $\ln Q!$ is a constant, after using Stirling's formula[9] the objective function becomes as in Equation 2.34.

$$\min \sum_{rs} \left(q_{rs} \ln q_{rs} - q_{rs} \right) \tag{2.34}$$

Equation 2.34 is the major component of the second term in Equation 2.30. Sheffi (1985) has shown that the derivatives of the Lagrangian of Equation 2.30 with respect to the path flow variables f_k^{rs} result in the UE conditions, and that the derivatives of the Lagrangian with respect to the O-D flow q_{rs} are given by Equation 2.35.

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[9] Stirling's formula is an approximation for large factorials, typically described as $\ln n! = n \ln n - n + O(\log(n))$ in which $O(\log(n)) = \frac{1}{2} \ln(2\pi n)$

$$\frac{1}{\xi}\ln q_{rs} + u_{rs} - \mu_r - \lambda_s = 0 \qquad \forall r, s \tag{2.35}$$

The results can be converted to a more familiar form of gravity model equation, as in Equation 2.36.

$$q_{rs} = A_r B_s O_r D_s e^{-\psi_{rs}} \qquad \forall r, s \tag{2.36}$$

where A_r and B_s are the balancing factors for origin r and destination s respectively; for more information. It is seen in Equation 2.36 that the friction factor is composed of an exponential function.

Since travel costs are not directly considered in the entropy model, as described in Equation 2.32, the entropy model tends to distribute trips from each origin evenly among all its destinations. The parameter ζ in equation 2.30 serves as weight. The smaller its value, the larger influence the entropy model will have on the final solution, and the greater the dispersion in O-D flows that will be observed. ζ should be calibrated from data if observed O-D counts are available. Otherwise, ζ can be set close to the observed system-wide average travel length in minutes.

The complete solution algorithm adopted for the combined trip distribution and traffic assignment problem is given in Metaxatos *et al.* (Metaxatos *et al.*, 1995).

2.3.2.4. Other Models

Finally, other types of models cannot be classified into these two previous groups (CB and TB). Although these models will not be used directly for this study, the different theories help to understand the state of the art of freight modelling, the developments and changes. One example is the agent-based models, which model the dynamics of complex systems and complex adaptive systems composed of autonomous, interacting agents. Agent-based models include models of behaviour and are used to observe the collective effects of agent behaviours and interactions (Macal and North, 2010). These models are used in a variety of domains, disciplines and applications because of their ability to intelligently decide what to do and perform in events that have not necessarily been anticipated by the modeller (Wooldridge, 1999). In freight transport, agent technology aims to provide new concepts and abstractions to facilitate the design and implementation of distributed and heterogeneous systems, such as decision support for logistics management (Davidsson *et al.*, 2005). Freight transport has many agents, including shippers, customers, and carriers; and goods are heterogeneous in its characteristics: volume, weight, and shape (Wisetjindawat *et al.*, 2007).

Agent-based models can be applied in most transport logistics applications. However, some features should exist in the application in order to efficiently apply the agent technology, as stated by Parunak (1999): modular (each entity has a well-defined set of state variables); decentralized (can be decomposed into stand-alone software processes); changeable (the structure may change quickly and frequently); ill-structured (not all information is available on the design phase); and complex (large number of different interacting behaviours). Thus, if an application does not fit well into these features, agent technology may only add unnecessary complexity. Although the agent-based technique can be used to model strategic freight transport decision making, very little work has been done in this sense and most applications have been made for short or medium term issues (Davidsson *et al.*, 2005).

Another type of model that does not fit into the TB or CB groups is the dynamic traffic assignment (DTA) model. These models were built to better utilise the information acquired through intelligent transportation system (ITS) technologies. DTA models simulate traffic conditions on congested networks that cannot be analysed by static assignment procedures, or other dynamic models that consider network restrictions (Janson, 1991). DTA models determine traffic loadings on arcs and paths of the road network in a dynamic setting (Friesz *et al.*, 2008). DTA models may also be used to investigate whether and to what extent urban traffic congestion and related impacts can be reduced by redistributing traffic from peak hours; to generate forecasts of traffic that illustrate how congestion levels vary with time; to examine the effectiveness of alternative traffic management plans during emergencies and special events; to help in the development of real time vehicle routing systems and to model time-varying traffic flows on congested networks (Janson, 1991). For instance, Taniguchi and Shimamoto (2004) developed a DTA model to optimize goods supply and calculate travel times and emissions of goods deliveries through a dynamic vehicle routing and scheduling model that incorporates real time information using variable travel times.

According to Friesz *et al.* (2008), DTA models can be either an equilibrium or disequilibrium model in nature and can be divided into two categories: those that employ rule-based simulation, and those that are entirely based on equations and inequalities. The authors present in detail the formulations of the second type of DTA models, referred as analytical DTA. They examine and compare different types of dynamics used as the foundation of analytical dynamic network models: dynamics based on arc exit-flow functions, dynamics with controlled entrance and exit flows, and tatonnement[10] and projective dynamics.

Finally, it is important to highlight that DTA simulations need continuous traffic counts for the validation of the model. Detailed information about traffic counts on links is not available for a national network. Moreover, DTA models are best for urban traffic modelling and for congested networks, which are not the case in the context of this thesis, where a national model for an uncongested network is investigated. Similarly, agent-based models are not yet extensively developed for freight transport analysis in a strategic level.

Other types of non-traditional modelling are the pure analysis of elasticity; the modelling of future travel demand based on current levels of demand and other known variables; marginal and corridor models; among others (Ortúzar and Willumsen, 2001). Nevertheless, they are mostly used for modelling of passenger transport, but can be adapted to freight transport. Other model is the gaming simulation. Normally games are sequential decision-making exercises structured around an artificial environment performing as proxy of the real world, and are used to better understand complex system and support the development of learning skills (Ortúzar and Willumsen, 2001). Additionally, Decision Support Systems (DSS) can also be used for modelling and analysing freight transport in a strategic level. For instance, Tavasszy *et al.* (1998) developed a DSS called SMILE (Strategic Model for Integrated Logistic Evaluations) that describes logistics chains at three levels: production, inventory and transportation and produces forecasts of freight flows for a large number of products and modes of transport. Therefore, logistics behaviour of firms and supply chain management are emphasized, but

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[10] Tâtonnement is French for groping or trial and error. In microeconomics, it is a process by which a perfect equilibrium can be reached, where buyers and sellers establish their prices separately and the prices gradually converge as supply and demand forces apply.

production and consumption, trade and more advanced strategic level analysis are not greatly considered.

2.4. Energy

The word "energy" comes from the Greek *energeia*, which translates to "activity, operation" and is often understood as the ability to perform work (Harper, 2010). Primary energy comprises all natural sources found in nature that has not been subjected to any conversion or transformation process, including fossil fuels (coal, petroleum, and natural gas), some nuclear fuels, hydro power and other renewables such as solar energy, geothermal, wind power, biomass, etc. Figure 2.5 shows the evolution from 1971 to 2007 of world total primary energy supply by fuel and the total world population. As depicted in Figure 2.5, 81.4% of total primary energy comes from fossil fuels, 41.8% of which is oil.

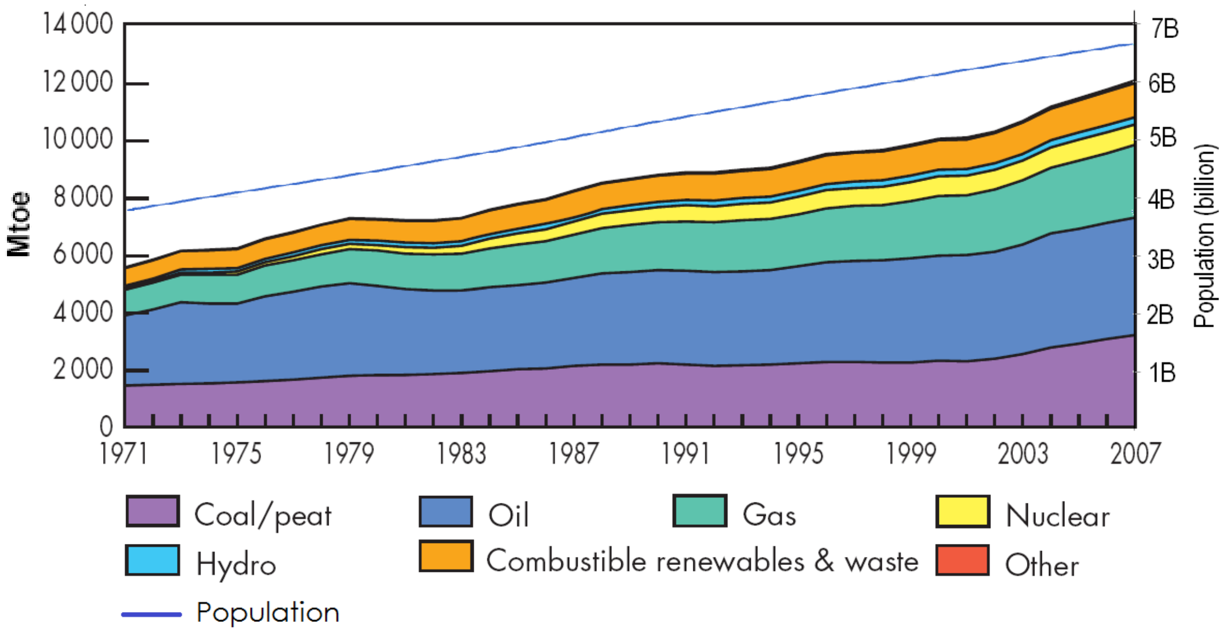

Figure 2.5: World total energy supply from 1971 to 2007 by fuel (Mtoe)

Source: Modified from IEA (2009)

The most widely accepted theory for oil origins is that it is formed by high pressure heating of organic elements. Crude oil is comprised of the processed remains of biological material which was buried in sediments over hundreds of millions of years and which transitioned to petroleum through chemical reactions. Thus, oil is a fossil fuel, like gas and coal, and is a finite and "non-renewable" resource (within a reasonable time period). The conditions required for oil field formation are very specific, which is why significant quantities are only found at certain locations around the world. For instance, the inert matrix material has to form a capstone allowing oil to flow and accumulate into a reservoir within a porous permeable rock, and this reservoir rock also needs special characteristics (Chilingar, 2005). Additionally, the massive oil formations occur in depths up to twelve kilometres. Once drilled, oil wells tend to behave similarly, with high initial pressure so oil can be easily extracted. Over time, pressure decreases until eventually the oil has to be pumped out, or enhanced oil extraction techniques have to be used, making drilling harder and more expensive. In all oil wells, once roughly half of the recoverable oil contained in the reservoir has been extracted, the production rate declines, until finally, a point is reached where further extraction is not viable.

Many of the oil wells of easy drilling are closed and the newly found oil deposits are deeper and more costly to extract. This cycle can be demonstrated by examining the energy return on investment (EROI) for oil extraction and discovery, that is the ratio of energy delivered from an activity to the energy it took to generate that energy, where inputs and outputs of different types of energy are aggregated by their thermal equivalents (Cleveland, 2005). In the 1930s the EROI was at least 100:1 and the present is about 20:1. Furthermore, when converting crude oil to gasoline the EROI drops to a range of 6 to 10:1 (Cleveland, 2005). Finally, according to Bardi (2009) and Hall (2008), the energy returned on energy invested is in further decline as time passes. In addition, the rate of discovery to the rate of consumption is about 1:3, i.e. for every 1 barrel of new oil discovered, 3 barrels are consumed (Library, 2010), which is not a sustainable behaviour.

The analysis of oil depletion is generally based on Hubbert's model. Hubbert (1956) fitted historical production of oil with a normal or Gauss bell-shape curve for the USA oil fields. In 1956 Hubbert predicted that in 1970 the US lower 48 states production of oil would peak. Despite the fact that his forecast was considered at that time very pessimistic by other agencies and researches, his prediction was exceptionally accurate. Since the recognition of his achievement, the Hubbert model became popular and has been extensively used worldwide to forecast oil production peak (Brown, 1979, Ivanhoe, 1995, Campbell and Laherrère, 1998, Bentley, 2002, Aleklett and Campbell, 2003, Deffeyes and Silverman, 2004). Although many scientists tried to disprove Hubbert's model, his results have predicted fossil fuels production more accurately than asymmetric curves, economic models, or Delphi techniques (Cleveland and Kaufmann, 1991).

Nevertheless, recent studies have shown that most oil producing countries do not fit well in the conventional Hubbert model, but on a ‘multicyclic Hubbert’ approach (Al-Fattah and Startzman, 2000, Mohr and Evans, 2009b, Nashawi *et al.*, 2010). The difference between both models is that the additional Hubbert production cycles are the result of external events that cause the production to deviate from its normal theoretical curve, such as technology evolution, government regulations and political events (Mohr and Evans, 2009a, Nashawi *et al.*, 2010). Nashawi *et al.* (2010) applied the multicyclic approach to analyse worldwide oil production for the 47 largest oil producing countries, which corresponds to virtually all conventional oil available. The authors’ analysis predicted that world oil production will peak in 2014, as observed in Figure 2.6, and according to their results world oil reserves are being depleted at an annual rate of 2.1%. Their study also showed that non-OPEC countries reached their peak production in 2006 and are being depleted at an annual rate of 5.6%, and OPEC’s crude oil production will peak in 2026 with an annual depletion rate of 1.25%.

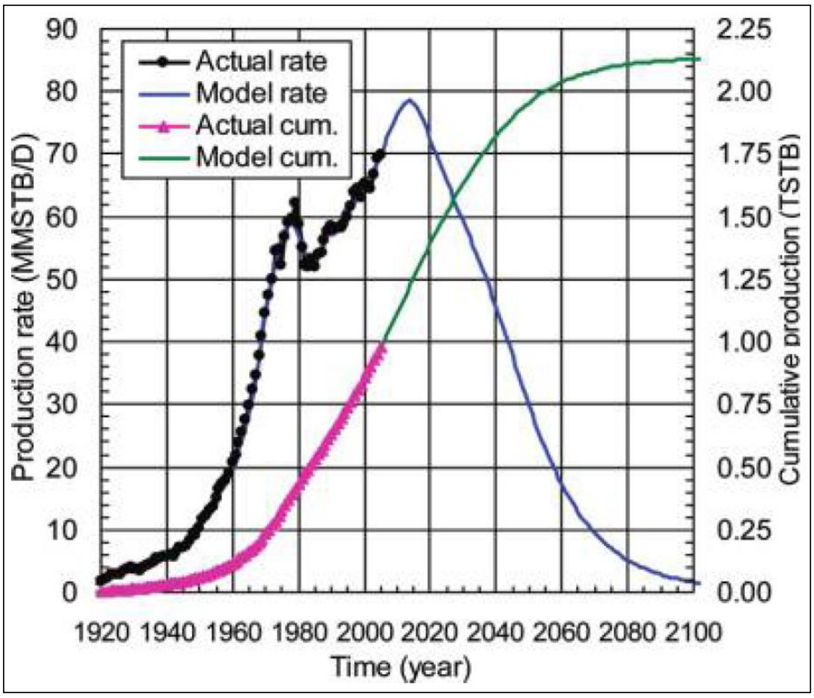

Figure 2.6: World crude oil production model based on a multicyclic Hubbert approach
Source: (Nashawi *et al.*, 2010)

The International Energy Agency (2008) shows oil production from existing fields peaked in 2007 with a 4.2% decline in 2008, and that a decline rate of at least 4% per annum is to be expected for the long term (IEA, 2008), which may be only a reflection of the price spike in 2008 and world economic crises and not a resource limit. Nonetheless, the International Energy Agency (IEA) has been historically conservative on oil supply (Krumdieck *et al.,* 2009). Looking at the history of oil production, it is observed it oscillates considerably, so it is necessary to wait a few years after the peak to confidently affirm that peak oil has happened.

To determine the real decline rate of fuel caused by peak oil, it would be necessary to know the exact world oil reserves. However, OPEC’s true reserves are unknown, as published reserves of about 900 Gigabarrels (Gb) are unaudited and are very likely to be overstated. For example, in 2007, the former Executive Vice President of Aramco (Saudi Arabia's national oil company) gave a presentation, in which he stated that OPEC oil reserves were overstated by more than 300 Gb (Tverberg, 2008). Proved reserves are estimated quantities of oil that analysis of geologic and engineering of data demonstrates with reasonable certainty (normally at least 90% confidence), and that are recoverable under existing economic, political, operating and technological conditions. If the OPEC’s values are correct, the world oil reserve would be in the order of 1,200 Gb, but a more reasonable figure is in the order of 1,000 Gb.

The decline in the rate of oil production is basically derived from the oil reserves, production rates and cumulative production. Oil production decline rates in giant oil fields can be as high as 20% per year (Höök *et al.*, 2009). The observed average decline rate of an oil field that has passed its peak production is 6.7% (IEA, 2008). Nonetheless, the decline rate of world oil production is probably going to be offset by the different phases of oil fields around the world. Thus, most authors suggest a moderate peak oil depletion rate of something among 2% and 5% a year (Odland, 2007, Hirsch, 2008, Schneider, 2008, Tverberg, 2008 etc, Nashawi *et al.*, 2010). The American department of energy indicated that if the ratio between reserves and production remains stable after peak oil, a sharper decline in global oil production is possible (EIA, 2000). Other energy studies suggest that the decline rate of global oil production could be much steeper, between 3.7% and 8% (EIA, 2000, Birol, 2008).

Although different authors obtained different peak oil dates and declining rates using different models and assumptions about present and future oil supply, it is a fact that oil is a finite resource and it is certain that world oil supply will peak and decline. The uncertainty lies in 'when' world oil production will peak and the decline rate, and not 'if' it will happen.

The range of peak oil dates and decline rates was studied by Dantas et al. (2007) using a probabilistic distribution. The authors took 11 published predictions of the peak oil date collected by Hirsch et al. (2005) and proposed a model function for the distribution of the possibilities. On the left hand side of Figure 2.7 it is shown the distribution of the probabilities plotted as a yearly histogram with the data points, and on the right the cumulative probability of peak oil occurring at any given year is presented. Such probability distribution, gives a good indication of the scale of the issue of peak oil occurrence and reduction in the long term (Krumdieck *et al.*, 2010) and again presents factual evidence of this approaching issue for modern society.

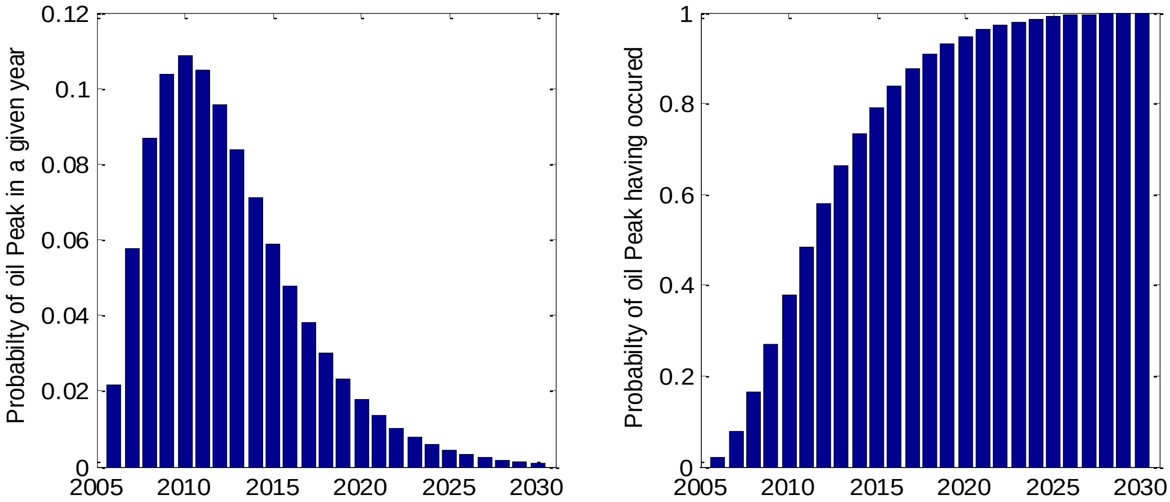

Figure 2.7: Probability model based on predicted dates

Source: (Krumdieck *et al.*, 2010)

2.4.1. Economics of Peak Oil

The supply and demand curves of oil are presented in Figure 2.8. The price elasticity of oil demand is very low, i.e. a major increase in price is required to significantly alter the demand. This situation is due to the high dependency on oil by consumers (industry, transportation, etc.). In addition, demand does not increase significantly if the price is reduced, because consumers meet their needs similarly to before. For example, the plastic industry will not produce more plastic due to the price decrease in crude oil, at least not in a short term. In the same way, the supply of oil is inelastic too.

Both the supply and demand of oil are quite inelastic due to the lack of a complete substitute for oil, which is why both curves in the figure are steep. On the demand side, substitution requires a very high investment and a long time to invest in new sources of fuel, such as biofuels, and to adapt the actual demand to other types of energy (i.e. electrify the railways). On the supply side, oil platforms cannot be transformed to drill any other thing. The only way for producers to change their production according to price is to expand production by building new oil platforms. Also, the speed of drilling is difficult to control, most times when a country decides to cut supply, it is made by increasing stocks, as oil drills have a fixed speed and cannot be ceased easily. These actions are very time and capital consuming, and depend on the production capacity.

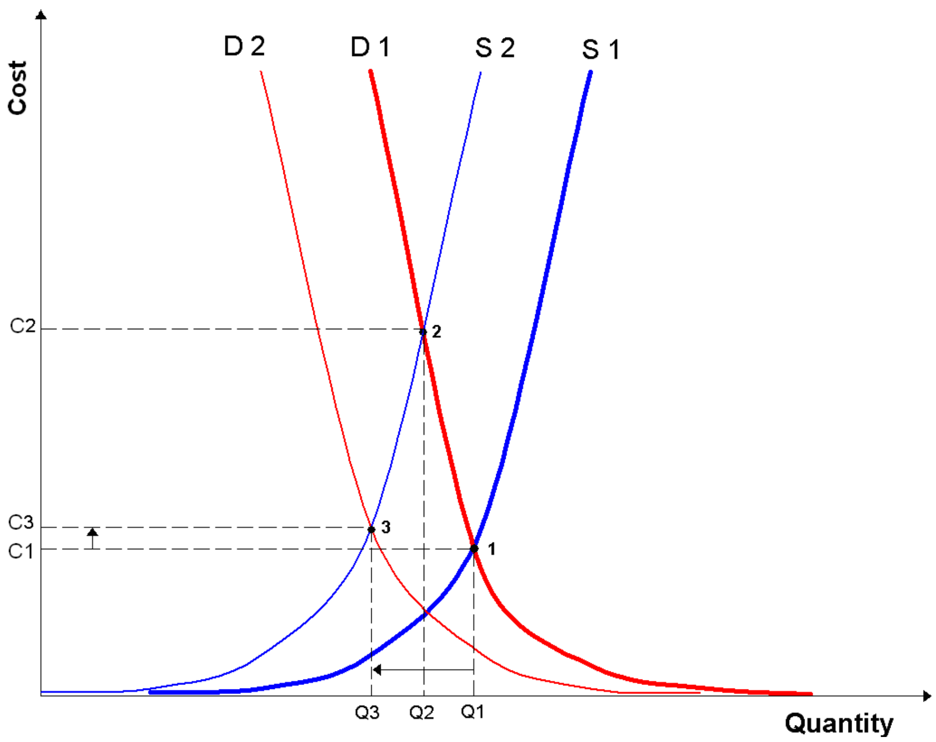

Figure 2.8: Supply and demand curves of oil

The S1 curve illustrated in Figure 2.8 refers to the supply of oil at the initial stage of analysis and D1 is the corresponding demand curve of oil; point 1 is the initial equilibrium point with Q1 and C1 being the associated quantity and price of fuel. With peak oil the supply will diminish, shifting the supply curve to the position 2 (S2) and point 2 is the new equilibrium point. When supply reduces, some demand is destroyed (Q2) and the price is increased (C2). One example of this is the do-nothing scenario, in which the reduction of supply causes a high increase in fuel costs.

This worst case scenario will not last long, once the implementation of mitigation options (MOs) takes place. They will come to reduce demand, as well as the high price would not be sustained for long, leading to demand destruction, shifting the demand curve to position 2 (D 2) and the new equilibrium point to point 3. The reduction of demanded quantity, from Q2 to Q3, leads to a reduction of cost from C2 to C3. Thus, a mitigation option will reduce the probability of higher fuel prices. MO could be implemented at all economy levels to reduce fuel consumption. MOs to reduce fuel use of freight transport may include: reduction of vehicle speed, increasing loading rates and space utilisation, reducing empty-running, advanced vehicle routing, changing the delivery times, changing the supplier of the products to more locally produced, using alternative fuels, information technology, using more efficient vehicles (engines), enhancing vehicle technology (aerodynamics, tires, lubricants, etc.), improving driver behaviour (through training and monitoring programs), using vehicles with greater capacity (less vans and small trucks), changing the land-use, adopting superior logistical trends (such as reverse logistics and rationalization of the supply chain). Some of these MOs can reduce not only the fuel consumption of the freight transport but also help other sectors.

The economics of supply constraints and MOs are showed in Figure 2.8, with the dynamics of the systems before and after mitigation options take place. The oil supply constraint, besides peak oil, could also be for other reasons such as political decisions, climate change and natural disasters. For example, on October 24th of 2008 the OPEC cartel decided to cut oil output by five percent, which corresponds to nearly two percent of global consumption (Schwartz and Mouawad, 2008). These sorts of actions are expected to continue in future.

Once mitigation options come to reduce the effects of oil constraints, moving the demand curve to the left, it is expected that suppliers will force themselves, for physical limitations or for financial reasons, to move the supply curve to the left again. The cycle of variation will continue until the equilibrium point, which is optimal for consumers and the market is achieved. For example, comparing the initial and final situations (point 1 and point 3), there is a large decrease in the quantity of oil used, but the increase in price is minimal. Mitigation options can reduce the impacts of oil supply constraints, and also reduce the final price of oil. The proportion of this variation (price and quantity) will depend on the characteristics of the MO and of the production restriction.

2.5. Concluding Remarks

This comprehensive literature review has found that to study the risks of a fuel constraint on freight transport and economy, a number of interrelated fields and concepts have to be understood, and this can be rather difficult. To estimate the impacts of peak oil, mitigation options or any program or project, including transportation projects, economic impact analysis tools should be employed. The highlights of the literature review are as follows.

- The economic impact techniques are many and among them, general equilibrium models provide the best method for analysing large projects as it takes into account the interrelationship between sectors and markets.
- Among the general equilibrium models, a widely used model is the Input-Output analysis. Such methodology provides a comprehensive framework to conduct economic analysis, so it can measure changes in economic activity resulting from programs and projects. Ultimately, Input-Output analysis takes into account interrelationships between sectors and markets, and requires less data when compared to similar methods. Modelling interactions between sectors is of special concern for transport analysis, as freight movement is strongly related to internal and external exchanges in a national economy.
- From the Leontief I-O model, other economists developed similar models for situations in which the assumptions of the traditional I-O could not be accepted. The supply constrained I-O is a valid and consistent model, and one that addresses part of the scientific problem, as it is suitable for analysing the impacts of fuel constraints on the national economy. Applications of this model have shown that the supply constrained I-O model is successful, to a certain extent, for evaluating the short-run effects of oil supply shocks and have better assumptions to account for supply constraints. Figure 2.9 shows the three studied I-O alternative approaches to analyse supply constraints,

emphasizing their key assumptions. In addition, MRIO models are extensions of the I-O technique, used to model more than one region/location.

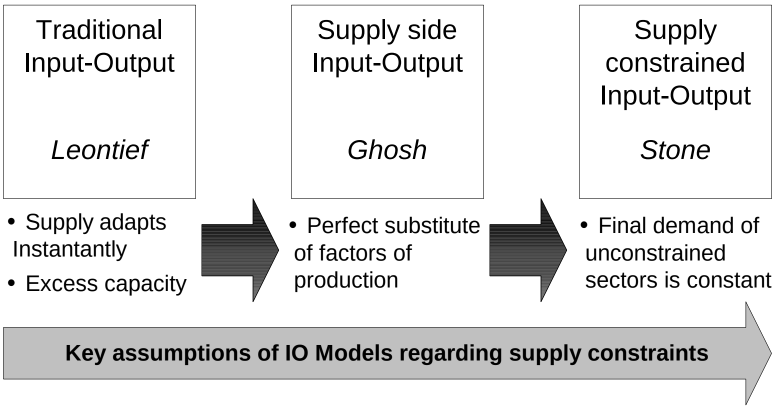

Figure 2.9: I-O Models and assumptions regarding analysis of supply constraints

- On the analysis of freight transport systems, despite the unquestionable logic of 4SM it was widely acknowledged that performing the steps individually and sequentially results in inconsistencies among the different models with regard to the definition of variables and coefficient values used for each model.
- Amongst the alternatives to 4SM, combined models consider many levels of travel demand modelling in an integrated and consistent approach. In particular, they are more attractive than others due to their easy link to I-O models. Traditionally, combined models use I-O to obtain the trip generation, and conduct the trip distribution and route assignment simultaneously. The feedback used among the steps guarantees that equilibrium is reached and the error is minimized. Another reason for the preference for this model is because of its effectiveness, efficiency and simplicity at the same time.
- There is evidence that the global world peak production of conventional oil ('Peak Oil') is likely to occur soon. Despite the uncertainty of when peak oil may happen, a mapping of all predictions shows the probability of happening at 2015 (or before) is about 80% (Dantas *et al.*, 2007). Fuel constraints will directly impact freight transport, which underpins economic development through the movement of goods. Moreover, supply constraints are expected to increase prices, impacting on long term consumption. After major changes, mitigation options would probably occur, reducing consumption (demand) and supply to reach a new equilibrium, with reductions in price.

3. ECONOMIC ANALYSIS

Prior to analysing the impacts of a reduction in fuel availability, this chapter reviews and discusses the current economic system in New Zealand. The economy is investigated through the application of a National I-O and a Multi-Regional Input-Output (MRIO) model. The intent is to estimate the level of monetary transactions amongst regions and all sectors of the economy, in order to subsequently analyse how these transactions manifest themselves in terms of freight transport movements, which is the subject of Chapter 4 (Freight Transport Analysis).

This chapter is divided into five sections. Section 3.1 develops an updated input-output table for the New Zealand economy. Then a MRIO is developed and applied to New Zealand. Section 3.3 analyses the results of the application and identifies the characteristics and limitations of the application. The last section presents the conclusions of the process of updating and regionalizing I-O models, with particular attention to the characteristics of New Zealand's economy.

3.1. New Zealand Input-Output

New Zealand is a small and isolated country situated in the South Pacific, consisting of two main islands (the North Island and the South Island) and many small islands, and is similar in land area to Japan. It has a population of around 4.3 million (Statistics NZ, 2010c) and operates under a parliamentary democracy political regime. New Zealand has an open economy and operates on free market principles. Its economy has substantial manufacturing and services sectors, an export-oriented agricultural sector, and tourism is an important source of export income (NZ Treasury, 2010).

> New Zealand's high proportion of winter sunshine hours and considerable rainfall provide an ideal resource base for pastoral agriculture, forestry, horticulture and hydro-electricity generation. Hydro-electricity provides a relatively cheap source of energy and has allowed the development of energy-based industries such as aluminium refinement. (NZ Treasury, 2010, p.3).

In terms of energy, New Zealand is not in an advantageous situation. Although about 73% of electric power is produced by renewable sources, electricity only represents 26% of energy usage and 62% of the total energy use comes from fossil fuels, namely oil (47%), gas (11%) and coal (4%) (MED, 2010). New Zealand is therefore considerably reliant on fossil fuels. In addition, there are not many options to shift from traditional fuels, e.g. to biofuels, and 95% of fossil fuels used internally are imported from three main locations: the Middle East, the Far East and Australia. Thus, geographic, political or economic instabilities in these places would probably rapidly affect the national economy and cause disruptions to its internal fuel supplies. Finally, New Zealand's economy is greatly dependent on international trade, mainly with Australia, the USA, Japan and China.

Geographically and politically, New Zealand is divided into 16 regions, namely: Northland, Auckland, Waikato, Bay of Plenty, Gisborne, Hawke's Bay, Taranaki, Manawatu-Wanganui, Wellington, Tasman, Nelson, Marlborough, West Coast, Canterbury, Otago and Southland. A region is the top tier of local government in New Zealand. Among the regions, twelve are governed by an elected regional council, while four are governed by territorial authorities.

3.1.1. Customizing the I-O Table

Based on the I-O analysis theory, described in section 2.1.1, a National Input-Output for New Zealand was developed to explain the present economic system of the country. The last official set of input-output tables produced by Statistics New Zealand (SNZ) dates back to 1995/96. Stroombergen (2008) published an updated version of the 2005/2006 I-O table (Appendix A.1.). This table was chosen, but it first had to be adapted to our context and updated to the year 2009. Hence, the next subsection describes the customization of the New Zealand I-O table.

To simplify the I-O table, it was assumed that each sector comprises one industry and produces one aggregate commodity. Therefore, the words sector, industry and commodity are used interchangeably in this thesis. The original table of 53 sectors was reduced to 51 sectors to adapt to the available data and also to match the purpose of this analysis. A fuel sector was created by combining two initial sectors, namely "oil and gas extraction, production and distribution" and "petroleum refining and product manufacturing". Also, the imports of the fuel sector were included[11] as domestic transactions due to the fact that when studying peak oil, both sources of petrol (domestic and imported) would be constrained, especially the fuel imports. In addition, transport sectors were separated into different sectors to represent each of the freight transport modes (road, rail and water transport). The mode split separation was made by using proportional coefficients, which represents the mode share of freight tonne-km moved, i.e. road, rail, water and other freight transport for the last freight transport matrix developed to New Zealand (Bolland *et al.*, 2005). The sectors of electricity transmission and electricity distribution were combined as one electricity sector, due to statistical data limitations. For the same reason, the real estate sector and the ownership of owner-occupied dwellings sector formed a housing sector. Table 3.1 lists the industries of the I-O table of New Zealand.

Table 3.1: Industry classification used for the I-O table

N.	Acronym	Industry Grouping
1	HFRG	Horticulture and fruit growing
2	SBLC	Livestock and cropping farming
3	DAIF	Dairy and cattle farming
4	OTHF	Other farming[12]
5	SAHF	Services to agriculture, hunting and trapping
6	FOLO	Forestry and logging
7	FISH	Fishing
8	COAL	Coal mining
9	FUEL	Fuel: Oil and gas extraction, production & distribution and Petroleum refining, product manufacturing
10	OMIN	Other Mining and quarrying
11	MEAT	Meat manufacturing
12	DAIR	Dairy manufacturing
13	OFOD	Other food manufacturing
14	BEVT	Beverage, malt and tobacco manufacturing
15	TCFL	Textiles and apparel manufacturing
16	WOOD	Wood product manufacturing
17	PAPR	Paper and paper product manufacturing
18	PPRM	Printing, publishing and recorded media

11 Although some may argue that the domestic oil industry was established to reduce the impacts of fuel shortage or price spikes, nearly all of the current light and sweet oil produced in New Zealand is exported, and the only refinery – Marsden Point - has difficulties in using the NZ oil, and has to blend it with other imported fuel.

12 The 'other farming' industry includes poultry farming (meat and eggs), pig, horse and deer farmings, beekeeping, tobacco, hops and cultivated mushroom growing and other crop and plant growing not elsewhere classified.

Table 3.1: Industry classification used for the I-O table (continued)

N.	Acronym	Industry Grouping
19	CHEM	Fertiliser and other industrial chemical manufacturing
20	RBPL	Rubber, plastic and other chemical product manufacturing
21	NMMP	Non-metallic mineral product manufacturing
22	BASM	Basic metal manufacturing
23	FABM	Structural, sheet and fabricated metal product manufacturing
24	MAEQ	Machinery and other equipment manufacturing
25	OMFG	Furniture and other manufacturing
26	ELEC	Electricity generation, transmission and distribution
27	WATS	Water supply
28	WAST	Sewerage, drainage and waste disposal services
29	CONS	Construction
30	TRDE	Wholesale and retail trade
31	ACCR	Accommodation, restaurants and bars
32	RDFR	Road freight transport
33	RDPS	Road passenger transport
34	RFRT	Rail freight transport
35	WFRT	Water freight transport
36	OFRT	Other freight transport (pipeline) and freight transport services
37	OTTR	Other passenger transport and transport services
38	COMM	Communication services
39	FIIN	Finance and insurance
40	HOUS	Housing: Real estate and Ownership of owner-occupied dwellings
41	EHOP	Equipment hire and investors in other property
42	SRCS	Scientific research and computer services
43	OBUS	Other business services
44	GOVC	Central government administration and defence
45	GOVL	Local government administration
46	SCHL	Pre-school, primary and secondary education
47	OEDU	Other education
48	HOSP	Hospitals and nursing homes
49	OHCS	Other health and community services
50	CULT	Cultural and recreational services
51	PERS	Personal and other community services

After defining the I-O sectors, the New Zealand I-O table of the year ended March 2006 (Appendix A.2.) was updated to the year ending March 2009. The updating process adopted in this thesis is akin the one used by McDonald and Patterson (2008), in which an input-output table of New Zealand was updated from 1996 to 1998. The gross outputs were adjusted to incorporate the changes in volume, price and productivity, as in Equation 3.1.

$$X_i^{2009} = FTE_i^{2009}\left(\frac{X_i^{2006}}{FTE_i^{2006}}\right)\frac{\left(\dfrac{GDP_i^{2009}}{FTE_i^{2009}}\right)}{\left(\dfrac{GDP_i^{2006}}{FTE_i^{2006}}\right)}\left(\frac{PPI_i^{2009}}{PPI_i^{2006}}\right) \tag{3.1}$$

where:

X_i^{2009}= total output of industry i for the year 2009;

X_i^{2006}= total output of industry i for the year 2006;

FTE_i^{2009}= number of full-time employees of industry i in 2009;

FTE_i^{2006}= number of full-time employees of industry i in 2006;

GDP_i^{2009}= Gross Domestic Product (in constant prices) of industry i in 2009;

GDP_i^{2006}= Gross Domestic Product (in constant prices) of industry i in 2006;

PPI_i^{2009} = producer's Price Index for outputs of industry i of the year 2009; and

PPI_i^{2006}= producer's Price Index for outputs of industry i of the year 2006.

The first two terms on the right hand side of Equation 3.1 updates gross output for volume changes, assuming that changes in full time employment are a reasonable proxy for actual volume changes. The third term represents changes in productivity as a function of GDP contribution (in constant prices, base year 1995/1996) per employee in 2006 to the corresponding values in 2009. The last term is a price inflator which converts the values of GDP and total output from 2006 to 2009 dollars. The updating data was obtained from the Statistics New Zealand website (Statistics NZ, 2009a, Statistics NZ, 2010e, Statistics NZ, 2010d) and superior data[13] was incorporated when possible (Appendix A.3.). The industry classifications used for GDP, PPI and FTE are different. The different industry classifications are matched according to their definition and where no direct match is possible, a combination of industries is used. This industry matching procedure is also used for some final demand and value added categories.

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[13] It refers to reliable data obtained from experts, surveys, and other reliable (primary or secondary) sources. It gives information on part of one database that helps to complement and calibrate a database. For instance, through a set of reliable information of some individual cells of one large matrix it is possible to validate and calibrate the entire matrix.

To update final demand and final payments, superior data was also incorporated. It was assumed that the value added category of Taxes (Net Indirect Taxes) (vT_j^{2009}) and Depreciation + Operational Surplus (vC_j^{2009}) only experienced relative changes, as in Equation 3.2 and 3.3. The compensation of employees sector (vW_j^{2009}), which includes wages and salaries, represents about 41% of the total value added group. So, vW_i is a critical determinant of how accurate the up to date table would be, which was updated as shown in Equation 3.4. SNZ regularly produces estimates of total earnings per industry that are released at highly aggregated industry levels. However, some industries have a one-to-one match, enabling direct insertion of superior data for *ad hoc*[14] adjustments of the wages and salaries category. The final payments also included for the year 2006 a row of adjustments, which were added for rounding off purposes. In the 2009 table the adjustments row disappeared as the RAS method produces a balanced table.

$$vT_j^{2009} = vT_j^{2009}\left(\frac{GDP_j^{2009}}{GDP_j^{2006}}\right)\left(\frac{PPI_j^{2009}}{PPI_j^{2006}}\right) \tag{3.2}$$

$$vC_j^{2009} = vC_j^{2009}\left(\frac{GDP_j^{2009}}{GDP_j^{2006}}\right)\left(\frac{PPI_j^{2009}}{PPI_j^{2006}}\right) \tag{3.3}$$

$$vW_j^{2009} = FTE_j^{2009}\left(\frac{vW_j^{2006}}{FTE_j^{2006}}\right)\left(\frac{LCI_j^{2009}}{LCI_j^{2006}}\right) \tag{3.4}$$

where:

LCI_j^{2009} = Labour Cost Index for inputs of industry j of the year 2009; and

LCI_j^{2006}= Labour Cost Index for inputs of industry j of the year 2006.

[14] *Ad hoc* is a Latin phrase that is used to denote a solution designed for a specific problem or task that cannot be generalized or used for other purposes.

For the value added category of Imports (vF_j) and final demand category of Exports (yF_i) the updating procedure consisted of matching vF_j and yF_i with the Harmonised System (HS) commodity imports and exports for the manufacturing and primary producing industries (Statistics NZ, 2010b, Statistics NZ, 2010a). For that reason, the services industries were matched with New Zealand's international trade in services table (Statistics NZ, 2010f). For exports, the ‘Free On Board’ (FOB) measurements were used, and for imports the ‘Cost of goods, including Insurance and Freight’ (CIF) were employed to update vF_j and yF_i. For all the other final demand categories, only estimates of the totals by SNZ were available, thus a *pro rata* scaling was conducted for each final demand category.

Once international trade, value added, final demand and gross outputs were updated to volume and price changes, the national I-O table was balanced applying the RAS technique, through an algorithm developed in Matlab® (Appendix A.4.). For visualization purposes, a reduced I-O table of New Zealand is presented in Table 3.2. Final demand here includes exports and import adjustments. The 51 sectors were aggregated into seven and only total final demand and value added are shown. For a complete national I-O table, see Appendix A.5.

Table 3.2: Reduced transaction table of New Zealand 2009 (Million NZD)

Industries	1	2	3	4	5	6	7	Final demand	TOTAL OUTPUT
1 Agriculture	5,054.1	3.3	1.3	14,552.1	1,433.9	30.9	709.5	4,339.6	26,124.7
2 Mining	132.3	169.8	149.2	626.3	301.6	17.8	68.8	427.8	1,893.7
3 Fuel	549.2	271.9	3,716.3	1,627.9	2,261.8	457.8	554.4	153.9	9,593.2
4 Manufacture	3,085.8	63.1	220.5	15,127.0	11,397.3	220.6	4,414.2	46,462.4	80,990.8
5 Const, Trade, Pass Transp	2,049.3	284.3	387.1	4,996.7	20,641.2	969.2	9,762.2	65,579.9	104,669.9
6 Freight Transp	785.2	141.5	80.3	2,312.6	1,869.6	1,712.3	524.8	1,175.0	8,601.3
7 Services	3,102.5	138.1	346.6	6,467.6	16,414.0	1,277.0	40,125.4	82,472.7	150,343.8
8 Imports	1,961.9	30.2	0.0	9,616.2	10,680.2	339.1	6,151.7	30,674.3	59,453.8
9 Value Added	9,404.4	791.4	4,691.9	25,664.3	39,670.3	3,576.7	88,032.8	12,781.7	184,613.6
TOTAL INPUT	26,124.7	1,893.7	9,593.2	80,990.8	104,669.9	8,601.3	150,343.8	244,067.4	626,284.7

Observing the 2009 I-O table (Table 3.2), it is noticed that New Zealand’s economy is dominated by the services and trade industries, which together represented 41% of the total economy. The manufacturing industries represented 13% of the country’s total output. Yet, New Zealand is not a major manufacturing economy compared to international standards. It is rather an agricultural economy, as previously mentioned, with the economy being focused on primary industries (agriculture, forestry, milk and livestock). However, the total output of the primary industries represented only 6.1% of the total output. Also, it is said that New Zealand has an export-oriented agricultural sector (NZ Treasury, 2010), but the total exports of the agriculture sectors only represented 11.23% of the sector's output (values of exports not shown in the table). Interestingly, the exports of the manufacturing sector represented 37.47% of its total output. This dichotomy is caused by the consumption patterns. Nowadays, the global consumption of agricultural products has reduced compared to manufacturing and services sectors, which has notably increased. Moreover, the consumption of pure agriculture products has decreased, but they are sent to manufacturing industries to be processed before being consumed. For instance, wood manufacturing had a total output of NZD 4,125.6 million and paper products manufacturing had another NZD 2,966.0 million, while forestry and logging industry, which provide the raw materials for these industries, had an output of NZD 3,669.8 million. Similar patterns are perceived in other agriculture and manufacturing sectors that substantiate the previously mentioned statement. Likewise, Table 3.2 shows that the manufacturing sectors' purchasing of agricultural products represented 55.7% of agriculture sectors' sales.

Note that imports of the fuel sector appear as zero, but the real imports corresponded to 51.9% of the fuel sector output. This difference is because fuel imports were assumed as endogenous to the system, which is consistent with the assumption previously made that fuel imports would be constrained in the same way as internally produced fuel, in the case of a shortfall. Thus, if for some reason, fuel imports are set to zero, the input of the fuel sector would immediately decline 51.9%. The NZD 3716.3 million corresponds to 38.7% of the fuel sector output, therefore, the fuel sector is extremely reliant on its own extraction, production, distribution, refining and manufacturing. Furthermore, the sector is also reliant on the manufacturing, and trade (including construction and passenger transport) sectors, as well as the fuel sector. These three sectors together comprise 79.7% of the fuel sector sales. However, fuel represented only 2% and 2.2% of the inputs of the manufacturing and trade sectors, respectively.

The freight transport sector, on the other hand, had 5.3% of its inputs from the fuel sector and approximately 15% from the services sectors. Thus, the freight transport sector has the characteristics of a service sector; i.e. the freight transport sector involves the distribution of goods that are produced by the other industries. This is clear from the fact that the freight transport sector had only 0.3% of its output sold to the service sector (because services do not require the movement of goods), but had 15% of its inputs coming from the service sector. In addition, the freight sector purchases from the agriculture, mining and manufacturing sectors were only 0.4%, 0.2% and 2.6% of its total purchases, respectively. However, sales to these industries were 9.1%, 1.6% and 26.9% of total sales, respectively, and are considerably large.

The total final demand and value added sectors (including imports and exports) are predominant, corresponding to 38.9% of gross output, as shown in Table 3.2. Among the final categories, household consumption alone amounts to 17.1% of total output and salaries and wages amount to 12.8% of total input. Exports and imports are also key elements, equivalent to 9.6% and 9.9% of total production and purchases, respectively. The total value added for the services sector is NZD 88,032.8 million, which amounts to 58.6% of its total input, where 27.3% corresponds to salaries and wages and 27.3% corresponds to operating surplus (proxy for total pre-tax profit income). The value added of the manufacturing industry is NZD 25,664.3, which corresponds to 31.7% of its total output. Imports of the mining industry are only NZD 30.2 million, which is 1.6% of its total input, whereas the imports of the manufacturing industry are of NZD 9,616.2, which is 11.87% of the sector's input. Thus, contrary to what one might presume, the manufacturing industry is more export oriented than import oriented.

The results presented above are considered reliable and consistent with the New Zealand economy. The elements that indicate high reliability are related to the experience and knowledge of the economic consultancy group which created the 2006 I-O table, the quality of the data used to update the I-O table to 2009 (assessed as good by the Statistics New Zealand department), the use of consistent and highly regarded methods (such as RAS), and the low errors of the estimates, when compared to observed data (see section 3.3.1).

3.2. Multi-Regional Input Output Model for New Zealand

A MRIO model was developed for the understanding of the interdependencies of New Zealand's regions. The construction of a MRIO model for the 16 regions of New Zealand was based on the National I-O models, through the use of non-survey methods. The LQ is the most known and used non-survey method and considered among many scholars and practitioners to be the one that bestows the best results (Miller and Blair, 2009). Nonetheless, there is evidence in the literature that CILQ produces better interregional estimates for New Zealand (Statistics NZ, 2003). Thus, both LQ and CILQ were tested and the results indicated that LQ gave better results for this specific application. Therefore, the MRIO model was constructed based upon the LQ mathematical formulation, which was presented in section 2.2.2.1 and the Generation of Regional Input-Output Tables (GRIT) process.

The GRIT process uses the LQ method and creates a routine for the creation of MRIO models. It was developed by Jensen and West (Jensen *et al.*, 1979, West *et al.*, 1979, West *et al.*, 1980, Jensen and West, 1988) to derive regional input-output tables by allowing superior data to be included together with the LQ. The GRIT procedure has already been applied to New Zealand and has attained consistent results (Statistics NZ, 2003).

The first two steps of the GRIT process (described in subsection 3.1.1 above) are to start with the best available national level input-output table and update it to the required year. The third step is the calculation of the regional output in each industry. The total output of each region is normally calculated as a function of regional share of the 'Full Time Employee' (FTE). Nevertheless, it was initially suspected that the regional share of GDP was a better parameter to calculate gross output. Hence, an econometric test was conducted with each of the variables to check which one best represents total output for the national I-O table. Three correlation tests were performed (Kendall's, Spearman and Pearson). Two sets of tests were performed for the industries with a perfect match between the different industry classifications and for the industries that do not have a perfect match between the classifications. This process was repeated for the years 2006 and 2009. Table 3.3 shows the results of the 24 tests. All correlation tests were significant at the 0.01 level (2-tailed).

Table 3.3: Correlation analysis for different tests comparing gross output with GDP and FTE of industries with and without a perfect match between classification descriptions

Correlation Tests		Same Description 2009		Different Description 2009		Same Description 2006		Different Description 2006	
		FTE	GDP	FTE	GDP	FTE	GDP	FTE	GDP
Kendall's tau_b	Correlation Coefficient	.621	.895	.447	.655	.608	.895	.519	.776
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000
	N	18	18	33	33	18	18	33	33
Spearman's rho	Correlation Coefficient	.806	.965	.579	.830	.781	.967	.614	.842
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000
	N	18	18	33	33	18	18	33	33
Pearson Correlation	Correlation Coefficient	.791	.903	.610	.864	790	.907.	.604	.844
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000
	N	18	18	33	33	18	18	33	33

It is evident in Table 3.3 that all the tests (Kendall's Tau-b, Spearman's rho and Pearson') had a similar trend in the results. The correlation determines the degree to which two variable's movements are associated. For example, a unitary positive value (+1) implies a perfect positive correlation, with a monotonic (Spearman) or linear (Pearson) equation perfectly describing the relationship between the two variables. Table 3.3 shows that industries with the same description between classifications are better explained by one variable, for both GDP and FTE. In addition, GDP had higher correlation coefficients than FTE. It is observed that the correlation is higher in 2006 than in 2009, for both types of industries. The 2006 values are probably more accurate than the 2009 ones, because the 2006 gross outputs (GO) were calculated by specialists in this field, giving more accurate procedures than the RAS technique used for the 2009 estimates.

It is also noticeable that industries with an equivalent description between different classifications have greater correlation coefficients, due the fact that the GDP and the number of FTE are more precise for those industries. The correlation coefficient between GDP and GO was much closer to one than the correlation between FTE and GO. Hence, it is concluded that GDP represents gross output better than FTE at the national level for all industries, and so it is a better parameter to predict GO. At the same time, some industries were tested with FTE and presented better results. For this reason, regional GDP per industry was used to calculate regional GO of the majority of industries (41 out of 51), with the exception of 10 industries: horticulture and fruit growing; dairy and cattle farming; rubber, plastic and other chemical product manufacturing; basic metal manufacturing; electricity generation, transmission and distribution; water supply; rail freight transport; water freight transport; other freight transport (pipeline) and freight transport services; and local government administration.

The next step was to convert the national table into technical coefficient format, A. The regional technical coefficients a_{ij}^{r} were calculated according to the number of full time employees in each industry and region (Equations 2.21 and 2.22), obtained from Statistics NZ (2009c, 2009b).

Following, for the MRIO construction, was done the regionalization of final demand (*Y)* and value added. Each final demand sector was numbered according to its appearance on the I-O table, from *y1* to *y4*. Private consumption from households (*y1*) was determined by the number of households and the household income, as in Equation 3.5.

$$y1^{r} = y1^{n}\left(\frac{\sum_{l} I_{l}^{r} R_{l}^{r}}{I^{T} R^{T}}\right) \tag{3.5}$$

where:

$y1^{n}$ = national private consumption;

R_{l}^{r} = number of resident in each region r for each income level l;

R^{n} = total population in the country;

I_{l}^{r} = income in dollar values for each income level l in each region r; and

I^{n} = total income of all nation residents.

The information on region total incomes is not explicit on the SNZ website. Instead, the NZ 2006 Census data comprises information in terms of number of residents for each of the 15 income levels. An average value for each income range was adopted for most ranges; exceptions were the “\$100K[15] or greater” income range, which was regarded as \$150K, and the “not specified” income range, which was assumed to be equal to the national average

[15] 1K = 1,000 (one thousand).

income. This function ignores the presence of inferior goods[16], which is adequate as the inferior-goods effects on New Zealand consumers is not significant (Messick, 2007). Alternatively, when possible, the ideal way to estimate *y1* would be to use information on consumption for each industry and region.

Final consumption expenditures, excluding private consumption (private non-profit institutions serving households, central government and local government) were considered as a function of regional population size, as in Equation 3.6.

$$y2^r = y2^n \frac{pop^r}{pop^n} \tag{3.6}$$

The final demand sectors of ‘Stock Change’ and ‘Gross Investment’ ($y3$ and $y4$) were regionalized by assuming that the regional ratio of $y3$ and $y4$ to the industries in the I-O matrix is equivalent to that of the nation, as in Equation 3.7.

$$\begin{aligned} y3^r &= y3^n X_i^r / X_i^n \\ y4^r &= y4^n X_i^r / X_i^n \end{aligned} \tag{3.7}$$

Likewise, the regionalization of final payments (value added) was made by scaling up the national value added (Equation 3.8) minus compensation of employees[17]. The compensation of employees vW_j^r was regionalized considering information about salary and wages, because it is the most significant value added sector. SNZ has a record of the median income by disaggregated industry and spatial location. Thus, it was assumed that median earnings are a good proxy for average earnings[18] and vW_j^r was calculated as in Equation 3.8.

[16] A good for which demand decreases when consumers’ incomes rise is called an inferior good.

[17] “Compensation of employees consists of all payments in cash, as well as in kind (such as food and housing), to employees in return for services rendered, and government contributions to social insurance schemes such as social security and pensions that provide benefits to employees” (Index Mundi, 2012)

[18] The median is commonly used instead of the mean when the distribution is highly skewed, as income distributions often are.

$$vW_j^r = vW_j^n \frac{FTE_j^r.MI_j^r}{FTE_j^n.MI_j^n} \tag{3.8}$$

where:

MI_j^r = regional Median Income of industry j; and

MI_j^n = national Median Income of industry j.

The other value added sectors were estimated by scaling the value added of each individual industry by its corresponding share of national output. Wages and salaries were first subtracted from the value added and then the difference was redistributed to the remaining components of value added, as in Equation 3.9. Total value added corresponds to compensation of employees, net indirect taxes and depreciation and operational surplus ($vO_j^r = vT_j^r + vC_j^r$).

$$vO_j^r = \left(V_j^n \frac{X_j^r}{X_j^n} - vW_j^r \right) \left(\frac{vO_j^n}{V_j^n - vW_j^n} \right) \tag{3.9}$$

Value added inputs into the final demand categories were also regionalized. Value added inputs into household consumption were generated in the same way as for the industry inputs into household consumption, as in Equation 3.5. The remaining final demand categories (value added into non-household consumption final demand, vY_j^r) were estimated by assuming the ratio of regional to national total industrial output to remain the same, Equation 3.10.

$$vY_j^r = vY_j^n . \frac{\sum_j X_j^r}{\sum_j X_j^n} \tag{3.10}$$

Finally, for the value added category of Imports (vF_j) and final demand category of Exports (yF_i) the regionalization procedure consisted of scaling the regional to national output, for each industry, Equation 3.11.

$$\begin{aligned} vF_j^r &= vF_j^n X_j^r / X_j^n \\ yF_i^r &= yF_i^n X_i^r / X_i^n \end{aligned} \tag{3.11}$$

After calculating all regional final demand and valued added, as well as imports and exports, domestic imports and exports were allocated to the industries. To account for interregional trade, the difference between the location quotients that were smaller than one were accounted for as domestic imports and the ones that were bigger than one were accounted for as domestic exports. Note that regional economies are constantly more open than national economies, because international trade occurs simultaneously with inter-regional trade, as observed in Table 3.4.

Table 3.4: Total regional trade of New Zealand, 2009 (Million NZD)

Region Name	Domestic Imports	Domestic Exports	Overseas Imports	Overseas Exports
Northland	1,137.0	974.0	1,741.2	1,333.5
Auckland	12,310.2	9,527.1	21,111.6	19,568.8
Waikato	1,646.8	2,572.1	4,933.1	4,651.6
Bay of Plenty	1,311.0	1,952.6	3,115.5	3,331.4
Gisborne	206.6	494.0	425.3	535.1
Hawke's Bay	1,118.4	2,226.7	2,013.5	3,447.7
Taranaki	1,660.2	1,324.0	3,362.8	3,093.3
Manawatu-Wanganui	548.2	1,617.5	2,398.7	2,197.5
Wellington	8,356.1	3,876.0	7,338.0	5,541.8
Tasman	251.3	470.2	436.3	597.5
Nelson	348.7	630.9	594.7	703.9
Marlborough	417.5	722.1	636.0	975.7
West Coast	546.8	564.1	536.0	429.7
Canterbury	846.3	2,367.0	7,062.9	6,968.3
Otago	310.8	1,293.5	2,446.8	2,600.9
Southland	624.1	1,028.3	1,301.4	1,558.4
New Zealand Total	**31,640.0**	**31,640.0**	**59,453.8**	**57,535.2**

As expressed in Table 3.4, New Zealand imports NZD 59,454 million and exports NZD 57,535, which matches with New Zealand's total imports, shown in Table 3.2, and total exports. At the same time NZD 31,640 million is traded among regions as domestic imports and exports. Observe that the total amount of domestic imports and exports are the same, because the amount of trade that is imported by regions has to be the same of the amount of trade exported by all the regions. This correlation is not true for the international trade, only if all international trade is analysed. For instance, NZD 73.8 million of coal was imported by the regions as domestic imports in 2009, thus the same NZD 73.8 million of coal had to be exported from the regions as domestic exports. If NZD 115.6 million of coal is exported from New Zealand they do not have to appear in the I-O table, as equilibrium is reached only when all the countries of the world imports and exports are included, i.e. only if a global I-O is analysed. However, cross hauling[19] is not accounted for.

The amount of international trade of the region of Auckland is NZD 40,680 million and NZD 21,837 million is trade with other regions. The interregional trade above calculated does not include interregional trade that is due the transport of goods and services from one region to another region's port. For example, all the international trade of the Gisborne region is transported to other regions, because Gisborne does not have any port or airport for the use of goods. Hence, the imports and exports allocated to Gisborne region, as shown in Table 3.4, refer to the amount of overseas goods and services from or to the production process of the region; i.e. the NZD 535.1 million are exports produced in the Gisborne, but they are not exported in this region, they are transported to another region to export overseas. This allocation of exports and imports was not done in the above described process. Thus, after the distribution of international trade to the ports and airports of other regions, the amount of interregional trade would increase substantially. Most regions have a greater level of international trade than interregional trade, except the West Coast region, which has approximately 15% more interregional trade than international trade.

For specific results, the complete set of I-O tables for each region is shown in Appendix B (Tables B.1 to B.16). Table 3.5 describes some of the important values for each region such as gross output, value added and final demand sectors of private consumption, government consumption, stock change and gross investment.

[19] Cross-hauling is the simultaneous shipment of the same product in opposite directions over the same route.

Table 3.5: Total regional trade of New Zealand, 2009 (Million NZD)

Region Name	Gross Output	Value Added	Private Consumption	Government Consumption	Stock Change	Gross Investment
Northland	16,755.7	4,860.0	2,704.9	1,315.4	63.8	1,020.7
Auckland	221,550.9	67,603.8	39,921.6	12,261.3	467.8	13,712.7
Waikato	52,144.1	14,720.9	8,688.1	3,447.2	120.0	3,672.5
Bay of Plenty	34,142.2	9,605.1	5,476.3	2,308.0	112.8	2,133.7
Gisborne	5,024.6	1,377.3	869.5	389.6	26.5	269.2
Hawke's Bay	23,539.7	6,154.4	3,358.3	1,308.6	47.3	1,114.4
Taranaki	25,348.8	6,597.0	2,708.1	940.9	14.5	2,866.7
Manawatu-Wanganui	26,071.2	7,368.2	4,927.9	1,943.4	53.6	1,713.7
Wellington	83,068.8	27,267.4	15,379.4	4,110.7	161.4	4,932.1
Tasman	5,177.3	1,411.4	755.3	395.1	19.6	299.1
Nelson	6,430.5	1,808.1	1,231.7	382.4	10.9	356.0
Marlborough	7,223.1	1,871.3	1,040.4	384.6	14.7	396.4
West Coast	4,501.8	1,251.8	749.5	277.0	9.8	339.1
Canterbury	74,612.1	21,460.1	13,568.3	4,745.9	134.5	4,626.5
Otago	26,703.6	7,508.7	4,756.8	1,741.2	46.6	1,792.6
Southland	13,990.3	3,748.1	2,224.8	797.1	24.6	848.7
New Zealand Total	**626,284.7**	**184,613.6**	**108,360.9**	**36,748.7**	**1,328.4**	**40,094.1**

Thus, as observed in Table 3.5, the total output of New Zealand is NZD 626,284.7 million, which matches exactly the value presented in Table 3.2. Similarly, the summation of the amount of value added, private consumption, etc., that each region produced equals the total amount of value added, private consumption, etc., that New Zealand traded. The most representative region is Auckland, which output represents 35.4% of the country's gross output. This is not surprising considering Auckland's regional population represents 33.3% of the nationwide population. However, Canterbury and Wellington regional residents are 13% and 11.1% of the total population, but their gross output represent 13.3% and 11.9%, respectively. Therefore, the Wellington region has a stronger market than Canterbury, both in terms of production and of consumption of goods and services. For instance, the private consumption of the Wellington region is larger than the Canterbury region, as well as gross investment.

Combining Table 3.4 and Table 3.5 it is possible to obtain more comprehensive information about the trade of each region. For instance, Tasman region has a total output of NZD 5,177.3 million, from which NZD 597.5 million corresponds to overseas exports and NZD 470.2 million corresponds to domestic exports, and another NZD 1469.1 relates to other final demand sectors. In the same way as in the gross output, the Auckland region had 34.5% of the interregional trade and 34.8% of the international trade, and is by far the most representative region in all aspects. Again, comparing Wellington and Canterbury regions, it is observed from

Table 3.4 that Wellington's interregional imports corresponded to 26.4% of total domestic imports, while Canterbury's trade is only 2.7% of the domestic imports. In terms of international trade, Canterbury had higher exports and lower imports than Wellington, probably due to the great amount of agricultural products that are produced and exported from Canterbury. To better substantiate the analysis, the regional output for seven consolidated industries is displayed in Table 3.6, along with the total final demand of each region, including exports and imports adjustments.

Table 3.6: Industrial regional output, 2009 (Million NZD)

Region Name	Agric.	Min.	Fuel	Manf.	Const., etc.	Frgt Trnsp.	Services	Final Demand
Northland	1,642.7	30.7	695.8	1,780.3	2,776.2	109.0	3,282.8	6,438.2
Auckland	1,873.8	96.2	2,967.4	29,392.3	37,583.5	3,797.2	59,908.4	85,932.3
Waikato	3,878.7	193.6	712.8	6,761.0	9,284.2	432.9	10,301.4	20,579.4
Bay of Plenty	3,252.1	48.1	353.7	4,833.5	5,566.3	362.4	6,364.0	13,362.2
Gisborne	786.9	2.7	9.0	611.3	575.2	22.6	927.0	2,090.0
Hawke's Bay	2,692.1	14.7	147.2	5,157.5	2,632.1	207.4	3,412.3	9,276.3
Taranaki	832.1	1,069.7	2,296.3	4,228.3	4,598.6	131.3	2,569.0	9,623.6
Manawatu-Wanganui	1,733.4	40.1	191.5	2,926.8	4,387.0	205.7	5,750.6	10,836.2
Wellington	837.7	45.4	608.1	5,316.3	14,758.7	1,616.1	29,761.1	30,125.4
Tasman	959.1	10.7	32.3	593.4	717.7	43.7	753.8	2,066.6
Nelson	272.6	1.3	31.2	969.0	931.4	70.7	1,469.4	2,685.0
Marlborough	871.5	5.3	42.9	1,411.1	1,006.7	85.6	988.3	2,811.8
West Coast	343.3	164.3	336.5	381.4	765.1	51.3	654.7	1,805.1
Canterbury	3,263.8	46.7	842.1	10,230.7	12,403.2	1,113.0	16,668.9	30,043.6
Otago	1,552.4	88.1	242.7	3,387.5	4,689.4	222.6	5,582.7	10,938.2
Southland	1,332.6	36.1	83.8	3,010.3	1,994.6	129.7	1,949.6	5,453.6
Total NZ	**26,124.7**	**1,893.7**	**9,593.2**	**80,990.8**	**104,669.9**	**8,601.3**	**150,343.8**	**244,067.4**

The industries on Table 3.6 stand for agriculture; mining; fuel; manufacturing, construction, trade and passenger transport; freight transport; and services, respectively. The agricultural sector of New Zealand is concentrated in the regions of Canterbury, Waikato, Bay of Plenty and Hawkes Bay. In a more detailed manner (Appendix B), the agricultural sector of horticulture and fruit growing is strong in the Tasman region; dairy and cattle farming are intense in the Bay of Plenty, Waikato and Canterbury, but dairy products manufacturing is more concentrated in Auckland, Hawkes Bay and Canterbury. The fish sector is strong in the regions of Marlborough, Nelson and Tasman; together they produce 37.2% of the fishing industry output. The mining sector is clustered in the Taranaki region, where 56.5% of the mining output comes from that region, but West Coast and Waikato also have a considerable mining sector. The forestry industry is concentrated in Northland, Waikato and Bay of Plenty; collectively they produce 46.2% of the industry output. The Bay of Plenty is also strong in other forestry related industries, e.g. wood (16.1%) and paper (23.6%). In contrast, Auckland generates only 7.9% of the forestry industry, but produces 24.5% of the wood manufacturing output and 34.3% of paper and paper products, indicating that forestry and logging production from Northland and part of Waikato is probably transported Auckland. The fuel sector is divided basically between two regions, Auckland (with 30.9%) and Taranaki (with 23.9%). The manufacturing and all the service sectors (construction, trade, transport and other services) are concentrated in the Auckland region. Auckland accounts for 24.9% of food related industries, around 44% of textiles, fabricated metal and machinery manufacturing industries, and about 50% of the printing, chemicals, plastics, furniture, fabricated and basic metals sectors. Besides Auckland, Canterbury is another region with relatively high amount of manufacturing and services. The construction, trade and transport (passenger and freight) sectors are more concentrated in Wellington than Canterbury, especially freight transport, which has NZD 1616.1 million in Wellington (i.e. approximately 19% of the sector’s output).

3.3. Economic Analysis of New Zealand

This section analyses the New Zealand economy at the national and regional levels. Initially, the I-O tables obtained from the process described above are compared to observed data, the most representative regions are explored and multipliers are used to identify how an exogenous force impact on the economic system. Lastly the MRIO model is analysed, the process and the obtained results are also compared and analysed at the regional scale.

3.3.1. Analysis of National Economy

Initially, the previously obtained 2009 I-O table was assessed against observed data of Gross Domestic Product from Statistics New Zealand. Table 3.7 and Table 3.8 show the observed values of Expenditure on GDP and Value Added, respectively, for the years 2006 and 2009, in current prices. The tables also present the estimated values, obtained from updating the 2006 table via the RAS technique, and the percentage error (*PE*), calculated as in Equation 3.12. Adjustments were made to reduce the errors on gross capital formation from 2006 to 2009. Considering the observed 2009 values of private consumption, gross investment and on changes in inventories, *ad hoc* adjustments were performed to reduce the errors, which were substantially diminished. The error for private consumption reduced from 2% to zero percent, the error for inventory changes reduced from 36.6% to 0.6% and for gross investment reduced from 3.2% to zero percent. Note that the 2006 estimated value was obtained from an external source (Stroombergen, 2008), so the existing errors observed in the used table were inevitably further transferred for the 2009 table after the updating process.

Table 3.7: Expenditure on GDP, difference between observed and estimated values

Type	Year	Final consumption expenditure		Gross capital formation		Gross national expenditure	Exports of goods and services	Less imports of goods and services	Expenditure on gross domestic product
		Private	General government	Change in inventories	Gross Investment				
Observed (current prices)	2006	95,498	28,702	1,100	38,555	163,856	43,932	47,515	160,273
	2009	108,402	36,798	1,336	40,086	186,622	56,916	59,370	184,168
I-O Estimated	2006	93,590	28,661	697	37,319	160,267	43,290	47,469	156,088
	2009	108,361	36,749	1,328	40,094	186,532	57,535	59,454	184,614
Percentage Error	2006	-2.0%	-0.1%	-36.6%	-3.2%	-2.2%	-1.5%	-0.1%	-2.6%
	2009	0.0%	-0.1%	-0.6%	0.0%	0.0%	1.1%	0.1%	0.2%

$$PE_i = \frac{\sigma_i}{Obs_i} * 100 \tag{3.12}$$

where,

σ_i = the variance of the variable (Difference between the observed and the estimated value of the variable under investigation); and

Obs_i = the observed value of the variable.

In general, the *PE* between the estimated and observed values of GDP and its components were small. The total error for GDP is only 0.1%. Initial sources of errors from 2006 were adjusted and the biggest source of error for the year 2009 is in exports of goods and services category.

Table 3.8: Value Added, difference between observed and estimated values

Value Added (Current Prices)	Observed		Estimated		*PE*	
	2006	2009	2006	2009	2006	2009
Operating Surplus + Depreciation	71,487	79,857	65,203	77,978	-8.8%	-2.4%
Compensation Of Employees	69,283	83,567	70,121	81,955	1.2%	-1.9%
Taxes on production and imports	20,384	23,170	20,764	24,680	1.9%	6.5%
Summation (Value Added)	161,154	186,594	156,088	184,614	-3.1%	-1.1%

In terms of value added categories, the error between observed and estimated values is as low as 1.1% and as high as 8.8%, being the 2006 error on operating surplus. The final error between observed and estimated values of total GDP from value added is 1.1% for the year 2009 and 3.1% for the year 2006. The error was reduced from 2006 to 2009 in most value added categories, except taxes. Thus, the errors calculated above indicate high reliability of the results.

Table 3.9 displays the top 11 industries, in terms of percentage of total output, using the 2009 I-O table with 51 sectors in Appendix A.5. The final demand corresponds to 39.0% of the total gross output.

Table 3.9: Industry participation of Total Output

No.	Acronym	Industry	Percentage of Total Output
30	TRDE	Wholesale and retail trade	7.0%
29	CONS	Construction	5.0%
40	HOUS	Housing: Real estate and Ownership of owner-occupied dwellings	4.2%
39	FIIN	Finance and insurance	3.6%
43	OBUS	Other business services	3.4%
44	GOVC	Central government administration and defence	2.0%
12	DAIR	Dairy manufacturing	1.8%
42	SRCS	Scientific research and computer services	1.7%
26	ELEC	Electricity generation, transmission and distribution	1.6%
24	MAEQ	Machinery and other equipment manufacturing	1.6%
9	FUEL	Fuel	1.5%

As observed in Table 3.9 the most substantial industries in terms of percentage of total output are the most aggregated industries, such as trade (wholesale and retail); construction [29]; housing (real estate and ownership of owner-occupied dwellings) [40]; and finance and insurance [39]. Other service industries also figured as representative of total output, such as other business services [43]; central government administration and defence [44]; and scientific research and computer services [42]. In terms of goods producing industries, the largest ones are dairy manufacturing [12]; machinery and other equipment manufacturing [24]; and fuel (oil and gas extraction, production & distribution and petroleum refining, product manufacturing) [9]. Another sizeable industry is electricity (generation, transmission and distribution) [26].

It is considered that the 2009 I-O table represents the most efficient technology to produce the goods and services in New Zealand and therefore it cannot be quickly changed. Hence, it is assumed that the purchase coefficients will remain constant (or quasi-optimal) even if there are variations in the composition of final demand in the near future.

3.3.1.1. Multiplier Analysis

An analysis of multipliers for New Zealand is conducted considering three widely used types of multipliers: output, income and employment. Multipliers for the model open with respect to households (type I) and closed with respect to households (type II) are calculated, as well as the average between and the rank of each industry.

Output Multipliers in New Zealand

Type I, type II and average output multipliers are shown in Table 3.10. Industries with large type I multipliers in New Zealand are MEAT, DAIR, ELEC, WOOD, FOLO, SBLC, OTHF, PAPR, COAL and CHEM. These results show that the industries related to forestry (wood products [16]; forestry and logging [6]; and paper products [17]), meat (meat manufacturing [11]; Livestock and cropping farming [2]; and other farming [4]) and dairy manufacturing [12] are relevant industries if one is interested in increasing the output of the economy through investments in final demand. This finding confirms the initial suggestion that the focus of New Zealand's economy is primary industries (agriculture, forestry, milk and livestock). Electricity has a strong linkage between the manufacturing industries of wood, paper and meat, and coal. Similarly, rail freight has a fairly high linkage between coal, paper manufacturing, forestry and meat manufacturing. Although the coal industry is one of the sectors that has the smallest gross output, it appeared among the top 10 with highest type I output multiplier, which includes only direct and indirect effects. Additionally, New Zealand is also well known for relying on export-based education, and the educational sectors (SCHL and OEDU) were among the industries with lowest output multipliers, together with the health related sectors (OHCS and HOSP) and the housing sector [40].

Table 3.10: Output multipliers

Industry			Type I Output Multiplier	Rank	Type II Output Multiplier	Rank	Average Output Multiplier	Rank
No.	**Name**	**Abbrv**						
1	Horticulture and fruit growing	HFRG	1.89	32	3.38	20	2.63	20
2	Livestock and cropping farming	SBLC	2.24	6	3.57	9	2.91	6
3	Dairy and cattle farming	DAIF	2.12	15	3.34	22	2.73	14
4	Other farming	OTHF	2.23	7	3.48	12	2.86	7
5	Services to agric, hunting and trapping	SAHF	1.87	34	3.62	8	2.75	12
6	Forestry and logging	FOLO	2.39	5	3.56	10	2.98	4
7	Fishing	FISH	2.07	17	3.07	36	2.57	28
8	Coal mining	COAL	2.18	9	2.94	39	2.56	30
9	Oil and gas explr and extrc & Ptrlm refin and manuf	FUEL	2.02	22	2.35	50	2.18	47
10	Other Mining and quarrying	OMIN	2.15	13	3.15	31	2.65	19
11	Meat manuf	MEAT	2.71	1	4.19	1	3.45	1
12	Dairy manuf	DAIR	2.58	2	3.63	7	3.11	2
13	Other food manuf	OFOD	2.11	16	3.14	32	2.62	24
14	Beverage, malt and tobacco manuf	BEVT	1.67	46	2.35	49	2.01	50
15	Textiles and apparel manuf	TCFL	1.90	29	3.21	27	2.56	31
16	Wood prdct manuf	WOOD	2.45	4	3.73	5	3.09	3
17	Paper and paper prdct manuf	PAPR	2.20	8	3.20	28	2.70	17
18	Print, pub and rec media	PPRM	1.77	42	2.93	41	2.35	44
19	Fertiliser and other ind chem manuf	CHEM	2.17	10	2.73	44	2.45	38
20	Rub, plstc and other chem prdct manuf	RBPL	1.80	39	2.67	45	2.24	46
21	Nn-mtllc mnrl prdct manuf	NMMP	2.03	21	3.17	30	2.60	26
22	Basic metal manuf	BASM	2.01	23	2.81	43	2.41	42
23	Strctrl, sht and fab mtl prdct manuf	FABM	1.98	25	3.09	35	2.53	33
24	Machinery and equip manuf	MAEQ	1.86	36	3.05	37	2.45	37
25	Furniture and other manuf	OMFG	1.93	27	3.09	34	2.51	35
26	Electricity gnrtn and supply	ELEC	2.58	3	3.36	21	2.97	5
27	Water supply	WATS	1.90	30	2.64	46	2.27	45
28	Swrg, drain and waste disp srvcs	WAST	1.89	31	3.18	29	2.54	32
29	Construction	CONS	1.92	28	2.92	42	2.42	41
30	Wholesale and retail trade	TRDE	1.95	26	3.30	23	2.63	23
31	Accom, restaurants and bars	ACCR	2.03	20	3.41	17	2.72	15
32	Road freight transport	RDFR	2.05	19	3.21	26	2.63	21
33	Road passenger transport	RDPS	1.88	33	3.45	15	2.67	18
34	Rail freight transport	RFRT	2.17	11	3.53	11	2.85	8
35	Water freight transport	WFRT	2.05	18	3.10	33	2.58	27
36	Othr frght transp and frght transp srvcs	OFRT	2.15	12	3.39	18	2.77	9
37	Othr passngr transp and transp srvcs	OTTR	2.14	14	3.38	19	2.76	10
38	Communication srvcs	COMM	1.70	45	2.54	48	2.12	49
39	Finance and insurance	FIIN	1.86	35	2.99	38	2.43	40
40	Real estate and Ownership OOD	HOUS	1.42	50	1.72	51	1.57	51
41	Equip hire and invest in other prprty	EHOP	1.74	44	2.54	47	2.14	48
42	Scientific research and computer srvcs	SRCS	1.77	41	3.46	14	2.62	25
43	Other business srvcs	OBUS	1.83	37	3.21	25	2.52	34
44	Central gov admin and defence	GOVC	1.76	43	3.75	4	2.75	11
45	Local gov admin	GOVL	1.98	24	3.48	13	2.73	13
46	Pr-schl, prmry and scndry education	SCHL	1.17	51	3.83	2	2.50	36
47	Other education	OEDU	1.64	47	3.76	3	2.70	16
48	Hospitals and nursing homes	HOSP	1.43	49	3.70	6	2.57	29
49	Other health and community srvcs	OHCS	1.62	48	3.23	24	2.43	39
50	Cultural and recreational srvcs	CULT	1.80	40	2.93	40	2.37	43
51	Personal and other community srvcs	PERS	1.81	38	3.44	16	2.63	22

Once induced impacts, initiated through consumer spending, are considered (as recorded by type II multipliers), the ranking of industries that are most strongly interconnected with the economy modify. Meat manufacturing is still the industry with the highest multiplier. However, the educational sectors ([46] and [47]) are also eminent (in second and third places), unlike for type I multipliers, for which these two industries had very low values. Central government administration and defence; hospitals and nursing homes; and services to agriculture, hunting and trapping also have a high level of interdependence within the national economy (high type II output multipliers).

Other industries highly ranked are WOOD, DAIR, SBLC and FOLO, which also appear among the top 10 industries of type I multiplier. On the other hand, the coal and chemical industries had a low rank when induced effects were included in the analysis. Table 3.10 also shows the rank of the average between type I and type II output multiplier.

Hence, according to the abovementioned analyses, if the government is interested in maximizing total output generated by an additional dollar spent on the output of a sector, it should invest in the meat industry [11]. Even if there were millions of dollars to be invested, on the basis of maximizing output, the target industry should be the one with the highest output index, which in this case is the meat industry. Naturally, additional motivations for investments (such as strategic factors, social equity and a sector capacity of production) could be considered. Other industries to consider are the dairy manufacturing, the wood product manufacturing, the forestry and logging, electricity, livestock and cropping farm, other farming, and some transport related industries: rail freight transport, other freight transport services [36], and other passenger transport services [37]. In terms of maximizing the total output, among the least interesting industries are real state [40], beverage [14], communication, property hire and investment [41] and fuel [9].

Income Multipliers for New Zealand

Type I, type II, simple and total income multipliers are presented in Table 3.11, along with the rank of multipliers. Type I and type II multipliers have the same ranking and logically simple and total multiplier do too. Thus, only one ranking is shown for type I and type II multipliers and another rank for simple and total multipliers. This result was expected, because the ratio of type II to type I multipliers is a constant across all sectors, as demonstrated by Miller and Blair (2009). This means that the introduction of induced effects do not change the order of sectors that have greatest impact on income due to a change in the industry's output. In New Zealand the quotient between total and simple income multipliers and between type I and type I income multipliers is 1.328.

Table 3.11: Income multipliers

Industry		Simple Income Multiplier	Total Income Multiplier	Average simple/total Income Multiplier	Simple Rank	Type I Income Multiplier	Type II Income Multiplier	Average type I/type II Income Multiplier	Type I Rank
1	HFRG	0.47	0.63	0.55	11	1.55	2.05	1.80	42
2	SBLC	0.42	0.56	0.49	17	2.19	2.90	2.54	17
3	DAIF	0.38	0.51	0.45	24	1.99	2.64	2.32	22
4	OTHF	0.40	0.53	0.46	21	2.24	2.96	2.60	16
5	SAHF	0.55	0.73	0.64	5	1.43	1.89	1.66	46
6	FOLO	0.37	0.49	0.43	26	3.04	4.03	3.54	8
7	FISH	0.32	0.42	0.37	39	2.41	3.20	2.81	13
8	COAL	0.24	0.32	0.28	46	3.22	4.27	3.74	6
9	FUEL	0.10	0.14	0.12	50	5.30	7.02	6.16	2
10	OMIN	0.32	0.42	0.37	37	2.03	2.68	2.36	20
11	MEAT	0.47	0.62	0.54	12	3.20	4.24	3.72	7
12	DAIR	0.33	0.44	0.38	35	7.57	10.03	8.80	1
13	OFOD	0.32	0.43	0.38	36	2.46	3.26	2.86	11
14	BEVT	0.21	0.28	0.25	48	2.61	3.45	3.03	9
15	TCFL	0.41	0.55	0.48	18	1.69	2.24	1.96	38
16	WOOD	0.40	0.53	0.47	20	2.40	3.18	2.79	14
17	PAPR	0.31	0.42	0.37	40	2.42	3.20	2.81	12
18	PPRM	0.37	0.49	0.43	28	1.55	2.06	1.81	41
19	CHEM	0.17	0.23	0.20	49	4.13	5.47	4.80	4
20	RBPL	0.27	0.36	0.32	41	1.77	2.34	2.05	33
21	NMMP	0.36	0.48	0.42	30	1.95	2.58	2.26	27
22	BASM	0.25	0.33	0.29	44	2.48	3.29	2.88	10
23	FABM	0.35	0.47	0.41	33	1.87	2.47	2.17	31
24	MAEQ	0.38	0.50	0.44	25	1.70	2.26	1.98	37
25	OMFG	0.37	0.49	0.43	27	1.74	2.30	2.02	34
26	ELEC	0.25	0.33	0.29	45	4.67	6.19	5.43	3
27	WATS	0.23	0.31	0.27	47	1.97	2.60	2.29	25
28	WAST	0.41	0.54	0.47	19	1.79	2.38	2.08	32
29	CONS	0.32	0.42	0.37	38	2.02	2.68	2.35	21
30	TRDE	0.43	0.57	0.50	16	1.73	2.30	2.02	35
31	ACCR	0.43	0.58	0.51	14	1.71	2.27	1.99	36
32	RDFR	0.37	0.49	0.43	29	1.98	2.62	2.30	24
33	RDPS	0.50	0.66	0.58	9	1.48	1.96	1.72	45
34	RFRT	0.43	0.57	0.50	15	1.91	2.53	2.22	29
35	WFRT	0.33	0.44	0.38	34	1.94	2.57	2.25	28
36	OFRT	0.39	0.52	0.46	23	2.05	2.71	2.38	18
37	OTTR	0.39	0.52	0.46	22	2.03	2.69	2.36	19
38	COMM	0.27	0.35	0.31	42	1.96	2.59	2.27	26
39	FIIN	0.36	0.47	0.41	32	1.98	2.62	2.30	23
40	HOUS	0.09	0.13	0.11	51	3.64	4.83	4.23	5
41	EHOP	0.26	0.34	0.30	43	2.31	3.07	2.69	15
42	SRCS	0.53	0.71	0.62	6	1.50	1.98	1.74	44
43	OBUS	0.44	0.58	0.51	13	1.67	2.21	1.94	40
44	GOVC	0.63	0.83	0.73	4	1.33	1.76	1.54	48
45	GOVL	0.47	0.63	0.55	10	1.68	2.22	1.95	39
46	SCHL	0.84	1.11	0.98	1	1.05	1.39	1.22	51
47	OEDU	0.67	0.89	0.78	3	1.24	1.64	1.44	49
48	HOSP	0.72	0.95	0.84	2	1.15	1.52	1.33	50
49	OHCS	0.51	0.67	0.59	8	1.39	1.84	1.62	47
50	CULT	0.36	0.47	0.42	31	1.87	2.48	2.18	30
51	PERS	0.52	0.68	0.60	7	1.54	2.04	1.79	43

Industries with high simple/total income multipliers values in New Zealand are SCHL, HOSP, OEDU, GOVC, SAHF, SRCS, PERS, OHCS, RDPS and GOVL, which are all service industries, respectively. They include Pre-school, primary and secondary education [46]; Hospitals and nursing homes [48]; Other education [47]; Central government administration and defence [44]; Services to agriculture, hunting and trapping [5]; Scientific research and computer services [42]; Personal and other community services [51]; Other health and community services [49]; Road passenger transport [33]; and Local government admin. [45]. The industries high type I/type II income multipliers in New Zealand are DAIR, FUEL, ELEC, CHEM, HOUS, COAL, MEAT and FOLO, which are mostly manufacturing industries with the exception of forestry and logging [6] (primary) and housing [40] (service). Interestingly, most industries with a high rank for simple/total multipliers had a low rank for type I/type II multipliers, and vice-versa (note that the 4 industries with highest simple multiplier are the 4 industries with lowest type I multipliers). This statement can be proven by estimating the average rank between both categories of income multipliers. The median rank between simple/total and type I/type II multipliers is 26; the average rank is also 26, and there are 32 industries with an average rank between 23 and 29.

If the government is interested in maximizing only the income generated by an additional dollar spent on the final demand of a sector, then it should invest in education and health service industries, firstly on pre-school, primary and secondary education. However, if the government wants to maximize the total income effect generated by investing in the final demand of one industry, then it should invest on the dairy manufacturing or the fuel industry, preferably the dairy. The type I and II income multipliers are more interesting, as they incorporate the direct, indirect and induced (caused by an increase in household consumption due to an increase in income) effects. Consequently, it is preferable to invest in the dairy manufacturing, with the fuel industry being the second best option.

Employment Multipliers for New Zealand

Employment multipliers show the relationship between an additional unit of spending in the output of one industry and changes in the level of employment in an economy. Table 3.12 shows simple, total, type I and type II employment multipliers, as well as the ranking of each type of multiplier. Note that the output is measured in million NZD and employment in number of employees. Although simple and total employment multipliers do not have a constant variation across all sectors, they do not vary considerably among sectors. Likewise, type I and type II only present small differences in industries' ranking arrangements.

Table 3.12: Employment multipliers

Industry		Simple Employment Multiplier	Rank	Total Employment Multiplier	Rank	Type I Employment Multiplier	Rank	Type II Employment Multiplier	Rank
1	HFRG	13.48	7	17.55	8	44.29	25	57.63	31
2	SBLC	8.09	23	11.72	23	41.92	29	60.74	24
3	DAIF	7.64	25	10.95	26	39.55	35	56.71	32
4	OTHF	13.19	8	16.61	10	74.33	6	93.59	7
5	SAHF	17.01	4	21.78	4	43.86	26	56.17	33
6	FOLO	7.24	31	10.43	29	59.43	11	85.63	11
7	FISH	6.27	38	8.99	37	47.93	20	68.70	17
8	COAL	4.82	44	6.89	44	64.54	10	92.26	9
9	FUEL	1.80	51	2.69	51	92.36	2	137.97	2
10	OMIN	6.69	34	9.42	36	42.70	28	60.14	27
11	MEAT	10.22	17	14.24	17	69.84	8	97.38	6
12	DAIR	6.69	33	9.53	35	153.53	1	218.69	1
13	OFOD	7.62	27	10.41	30	57.77	12	78.98	12
14	BEVT	4.33	45	6.16	47	53.03	17	75.47	14
15	TCFL	11.39	15	14.93	16	46.64	22	61.18	23
16	WOOD	8.96	21	12.42	21	53.38	16	74.02	15
17	PAPR	5.18	42	7.88	42	39.82	34	60.60	25
18	PPRM	9.19	20	12.35	22	38.83	37	52.21	39
19	CHEM	3.13	49	4.63	49	74.08	7	109.62	5
20	RBPL	6.02	39	8.39	40	38.73	38	53.94	35
21	NMMP	6.48	35	9.58	34	34.99	39	51.75	40
22	BASM	4.17	46	6.32	45	41.30	30	62.66	22
23	FABM	7.56	29	10.60	28	39.97	33	56.03	34
24	MAEQ	7.63	26	10.88	27	34.31	41	48.97	41
25	OMFG	9.46	19	12.63	20	44.59	24	59.52	29
26	ELEC	4.14	47	6.27	46	78.05	5	118.24	3
27	WATS	3.40	48	5.41	48	28.67	45	45.59	44
28	WAST	12.16	11	15.66	15	53.49	15	68.93	16
29	CONS	7.49	30	10.22	31	47.87	21	65.30	20
30	TRDE	12.00	12	15.67	14	48.81	19	63.74	21
31	ACCR	19.98	2	23.72	3	78.79	4	93.54	8
32	RDFR	8.02	24	11.18	25	43.26	27	60.28	26
33	RDPS	13.56	6	17.83	7	40.39	32	53.09	36
34	RFRT	6.32	37	10.01	33	28.11	46	44.52	45
35	WFRT	5.05	43	7.90	41	29.64	44	46.34	43
36	OFRT	13.02	10	16.39	11	68.10	9	85.73	10
37	OTTR	6.72	32	10.10	32	34.80	40	52.27	38
38	COMM	5.57	41	7.87	43	40.95	31	57.78	30
39	FIIN	5.67	40	8.74	38	31.51	42	48.56	42
40	HOUS	2.11	50	2.92	50	80.84	3	112.18	4
41	EHOP	6.35	36	8.55	39	57.65	13	77.58	13
42	SRCS	8.84	22	13.44	18	24.72	49	37.59	48
43	OBUS	11.90	13	15.67	13	45.42	23	59.80	28
44	GOVC	10.35	16	15.77	12	21.84	50	33.27	50
45	GOVL	7.61	28	11.67	24	27.02	47	41.44	46
46	SCHL	25.10	1	32.34	1	31.19	43	40.18	47
47	OEDU	14.36	5	20.14	5	26.44	48	37.07	49
48	HOSP	11.77	14	17.96	6	18.75	51	28.62	51
49	OHCS	19.72	3	24.10	2	54.01	14	66.00	19
50	CULT	9.64	18	12.72	19	50.38	18	66.49	18
51	PERS	13.08	9	17.51	9	39.09	36	52.33	37

The industries with top 5 highest employment multipliers for both simple and total multipliers are SCHL, OHCS, ACCR, SAHF and OEDU. These results are quite similar to those for income multipliers, as four out of five industries are among the eight highest simple/total income multipliers. The exception is the accommodation, restaurants and bars sector, which is dependent on tourism and generates a high number of employees, but it does not influence income because their employees' salaries are lower than in other sectors. Observe that the order of simple/total employment multipliers is similar to those for employment coefficients (FTE_j/X_j).

Industries with high type I/type II employment multipliers in New Zealand are DAIR, FUEL, ELEC, HOUS, CHEM, MEAT, OTHF and ACCR. Similarly to simple and total multipliers, these industries have a close match between the type I/type II income multipliers rank of top industries, excluding other farming [4] and accommodation, restaurants and bars [31]. Also note that there is a small variation in the order that those industries appear in the rank of type I and type II employment multipliers.

The average between type I and type II, and between simple and total employment multipliers was also calculated (not shown in the tables above). It was observed that the difference between the rank of both averages is well distributed, fitting a normal distribution well, at a significance level of 5%.

In the same way as for the income multiplier, if the government is interested in maximizing employment levels generated by an additional dollar spent on the final demand of a sector, then it should favour the pre-school, primary and secondary education sector. However, if the government wants to maximize the total employment effect generated by investing in the final demand of one industry, it is advised to invest in the dairy manufacturing industry, with the fuel industry being the second best option.

3.3.2. Analysis of Regional Economy

Initially, the obtained 2009 MRIO Table was assessed against observed data of Gross Regional Product (GRP) from Statistics New Zealand. Table 3.13 shows the estimated values of GRP for the year 2009 obtained from the MRIO model, the observed GRP per region in current prices, as well as the error. To better express and understand the error, three formulations were used to calculate the error: i) Root Mean Square Deviation (*RMSD*) as in Equation 3.13, ii) Root Mean Square Percentage Error (*RMSPE*) as in Equation 3.14, and iii) Mean Absolute Percentage Error (*MAPE*) as in Equation 3.15.

Table 3.13: Estimated regional expenditure on GRP and observed GRP

Region Name	**Estimated GRP**	**Observed GRP**	**Percentage Error / *RMSPE***	***MAPE***	**Deviation/ *RMSD***
Northland	4,860.0	4,666.2	4.2%		193.8
Auckland	67,603.8	67,521.8	0.1%		82.0
Waikato	14,720.9	14,727.5	0.0%		-6.6
Bay of Plenty	9,605.1	9,688.6	-0.9%		-83.5
Gisborne	1,377.3	1,375.5	0.1%		1.8
Hawke's Bay	6,154.4	6,010.2	2.4%		144.3
Taranaki	6,597.0	6,621.2	-0.4%		-24.2
Manawatu-Wanganui	7,368.2	7,395.3	-0.4%		-27.1
Wellington	27,267.4	27,620.6	-1.3%		-353.2
Tasman	1,411.4	1,359.0	3.9%		52.3
Nelson	1,808.1	1,830.3	-1.2%		-22.2
Marlborough	1,871.3	1,786.5	4.7%		84.8
West Coast	1,251.8	1,217.9	2.8%		33.9
Canterbury	21,460.1	21,315.8	0.7%		144.3
Otago	7,508.7	7,384.3	1.7%		124.4
Southland	3,748.1	3,649.7	2.7%		98.4
New Zealand Total	**184,613.6**	**184,170.5**	**0.3%**	**1.7%**	**126.4**

$$RMSD = \sqrt{\frac{\sum_{n} (\sigma_i)^2}{n}} \tag{3.13}$$

$$RMSPE = \sqrt{\frac{\left(\sum_{n} PE_i\right)^2}{n}} \tag{3.14}$$

$$MAPE = \frac{100}{n * \sum_{n} |PE|_i} \tag{3.15}$$

In error analysis, the *RMSD* is the most frequently used measure of the differences between predicted values by a model and the values actually observed in practice. An advantage of the

RMSD method against other error measurements is that it is measured in the same units as the data and is representative of the size of a ‘typical’ error. Additionally, *MAPE* error is also often useful for purposes of reporting model accuracy because it is expressed as a percentage, which provides a better insight on the magnitude of error measured regardless the unit used (in the case of this research, NZD). Observe that *MAPE* only measures the error for the entire dataset.

As observed in Table 3.13, the *RMSD* of the sample is NZD 126.4, which is much smaller than the variance of the total GDP (NZD 443.2). The *RMSPE* is only 0.3% and the *MAPE* is 1.7%, both small considering the sample size. The greatest source of error in terms of deviation is the Wellington Region (NZD 353.2), and in terms of percentage error is the Marlborough Region (4.7%). It was observed that using only FTE as an approximation to GO per region would generate errors of up to 17.6% (*MAPE*) and NZD 2300.4 (*RMSD*). Thus, it can be said that the estimates of regional output are consistent with observed regional data. Also, the GRIT process is reliable and has been extensively applied in New Zealand and Australia.

Despite the attempt to calculate accurate regional estimates through the MRIO model, using *ad hoc* improvements and including superior data when possible, the model still presents some limitations that cannot be fixed. For instance, non-survey techniques traditionally underestimate inter-regional trade and overestimate intraregional economic activity. The miscalculations are usually associated with the difficulty in representing cross-hauling and the shipment of a product in opposite directions over the same route. Cross-hauling occurs because it may be efficient to export and import a product than to consume it internally. Some production sites have natural cost advantage over others, products heterogeneity, and that there are economies of long-haul in transport (Haddock, 1978). Neglecting cross-hauling often generates an overestimation on the interdependence between regions culminating with inflated multipliers. Another issue in the MRIO is that industry technology and investment patterns for each region are considered the same as for the national economy. Regional industry technologies can however vary considerably, due to reasons such as age of capital stock, relative prices and resource availability, productivity patterns, levels of mechanization, labour efficiency and consumer’s preferences.

3.4. Concluding Remarks

Prior to analysing the impacts of a reduction in fuel availability, it was essential to understand the current economic system by identifying the monetary transactions between sectors and regions of the economy. The New Zealand's economy was investigated using its national I-O model and a MRIO model. Overall, the following observations were made.

- The procedure to customize and update an I-O table can be burdensome and data intensive, as is the production of a MRIO, especially when data availability is limited and many superior data and *ad hoc* adjustments are required.
- Available procedures and techniques, such as the GRIT procedure, can help to reduce the amount of assumptions to produce reliable results when modelling the economy using the I-O and MRIO methods.
- It is widely said that New Zealand's economy operates on free market principles and is strongly focused on tourism, primary industries (agriculture, forestry, milk and livestock) and greatly dependent on international trade. However, such statement can be confusing, as 2009 I-O table (Table 3.2) shows that New Zealand's economy is highly dominated by the services and trade industries, which together represent 41% of the total economy, while the primary industries accounted for only 6.1% of the total output.
- Although claimed to be an export-oriented agricultural economy (NZ Treasury, 2010), total exports of the agriculture sectors only represented 11.2% of the sector's output. Interestingly, manufacturing sector exports represented 37.47% of its total output. This dichotomy is caused by current consumption patterns, in which the global consumption of unprocessed agricultural products has reduced as they are firstly processed in the manufacturing industries.
- In terms of individual industries, the 51 sectors I-O table indicates that the most significant industries were trade (wholesale and retail); construction; housing (real estate and ownership of owner-occupied dwellings); and finance and insurance. Other service industries also figured as highly representative of total output with some manufacturing industries, such as dairy manufacturing; machinery and other equipment manufacturing; and fuel. Value added/final demand industries represented 39% of the total output of NZD 626,284.7 million.

- It has been found that the I-O table represents well the national economy. Differences between the estimated and the observed values were quite small, with errors in expenditure on GDP varying between zero and 1.1%, and the total error in GDP being only 0.1%. Further errors for value added categories were as low as 1.1% and as high as 6.5%.
- From a national perspective, the value of New Zealand imports and exports for the year 2009 were NZD 59,454 million and NZD 57,535 million respectively. Also, NZD 63,183 million was traded among regions as domestic imports and exports, excluding trade from one region to another region's port.
- The most representative region in the country is Auckland, where economic output represents 35.4% of the national gross output. The region has a high concentration of the manufacturing industries and services sectors, as well as interregional and international trades, comparing to the other regions. Other representative regions were Wellington, with high amounts of trade and services (13.3% of national gross output), and Canterbury which has substantial manufacturing and agricultural industries (11.9% of national gross output).
- Results from the MRIO indicated that the agricultural sector of New Zealand is concentrated in the regions of Waikato, Bay of Plenty, Canterbury and Hawkes Bay; the mining sector is clustered at the Taranaki region, West Coast and Waikato; and the fuel sector is concentrated in Auckland (30.9%) and Taranaki (23.9%).
- Regional results were considered accurate with low *RMSD* (NZD 126.4), *RMSPE* (0.3%) and *MAPE* (1.7%). Wellington Region presented the higher *RMSD* (NZD 353.2) while Marlborough accounted for the highest *PE* (4.7%). This indicated that the adopted procedure of using both FTE and GDP as an approximation to GO led to results more than 10 times better than using just the FTE.
- The multiplier analysis indicated that industries with high type I output multipliers in New Zealand are MEAT, DAIR, ELEC, WOOD and FOLO, which shows that the industries related to forestry, meat and dairy manufacturing are relevant industries, confirming that the focus of New Zealand's economy is primary industries. Meat manufacturing is also the industry with the highest type II output multiplier, and should be chosen if one is interested in maximizing total output generated by an additional dollar spent on the output of a sector.

- In regards to income and employment multipliers, the industries with highest type I and type II multipliers are education (pre-school, primary and secondary education) and health service industries. The industries with the highest total multipliers are the dairy manufacturing industry and the fuel industry.

In conclusion, this chapter analysed the monetary relationships and the economic trade among the different sectors and regions of New Zealand. The economic trade relates to the physical trade, as the exchange of money between regions correspond to the trade of goods and services observed in the real world. The physical trade describes the transport activities. In this context, the next chapter will present how outputs of the I-O and MRIO models are used to model freight transport.

4. Transportation Analysis

This chapter presents the estimation of a Freight Transport Model based upon the results of the economic analysis of New Zealand. In contrast to the traditional modelling techniques, in which freight generation is one step of the modelling process, this chapter uses the MRIO's economic relations established in Chapter 3 as an input. The freight model will serve to analyse the current freight transport movements in the country and to be a forecasting instrument. Therefore, it is assumed that the economic trade among regions better describes freight transport movements than the spatial socio-economic indicators. The freight model aims to reliably predict and support the investigation of the performance of transportation systems under likely future fuel constraints.

The chapter is divided into four sections. Firstly, the proposed modelling method is described in order to present the reader with the fundamental conceptual framework. The method comprises three steps, including the conversion of MRIO's results into transport data, geographic data acquisition / treatment, and the freight transport modelling. In the second section, the New Zealand case is introduced and the freight transport model is calibrated. The model is then analysed in terms of its performance and accuracy in the third section. The chapter concludes with initial findings about the advantages and disadvantages of applying such a modelling technique to investigate the impacts of fuel constraints in freight transport systems and conclusions from the freight transport model are drawn.

4.1. Integrating MRIO and Freight Transport Modelling

A general method is proposed to integrate Multi-Regional Input-Output modelling outcomes and transportation models to describe the current freight transport system (FTS). This method can be applied to analyse a FTS under fuel constraints for freight transport. Figure 4.1 illustrates the method, which is described as follows.

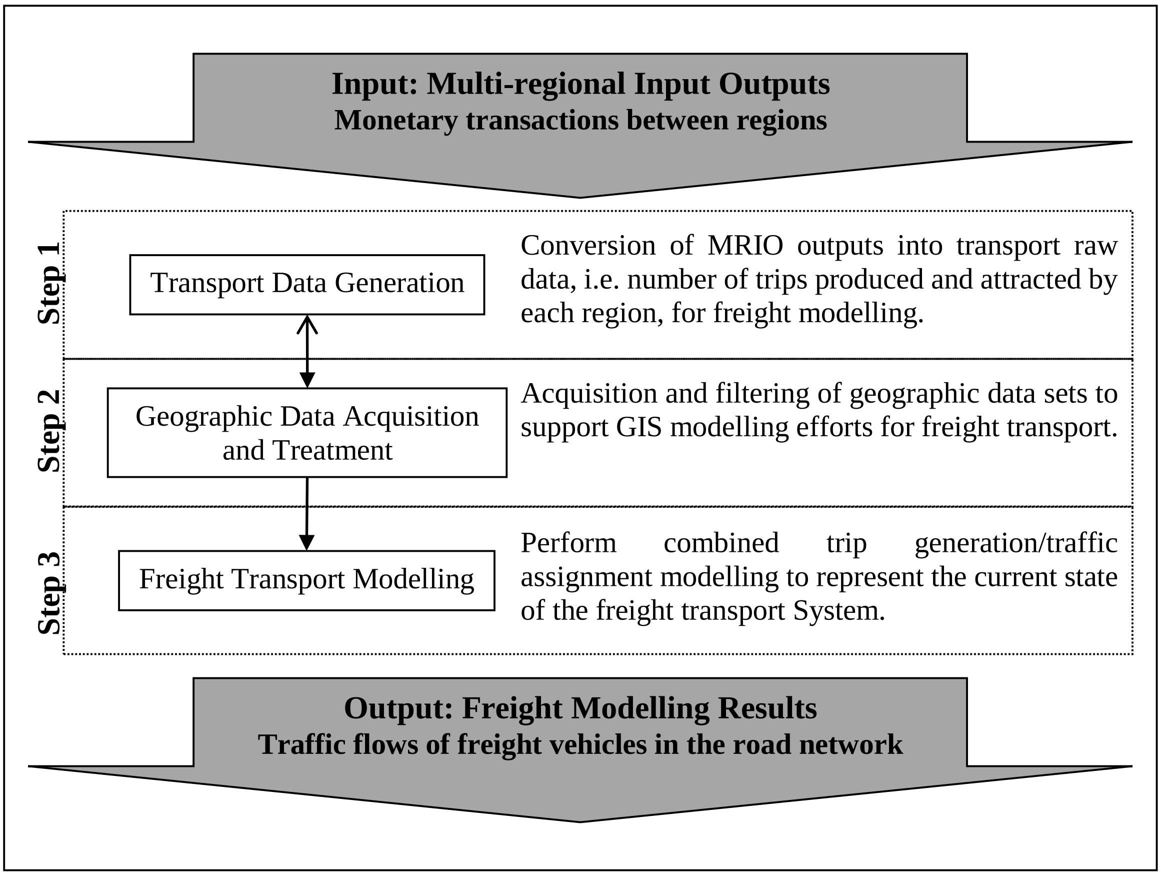

Figure 4.1: Freight transport model method.

The proposed method consists of three steps, which were designed to be applied in general contexts, i.e. not specific for individual economies or countries. The first step comprises the generation of transport data using outcomes provided by the MRIO method. The second step builds the transport database focusing on the acquisition of geographic data sets to allow modelling of freight transport activities. Note that Geographic Information Systems - GIS platforms were chosen due to their capacity for data processing, presentation and visualisation for transport modelling. The two initial steps have been described separately for presentation sake, but they could be performed in parallel due to intrinsic dependencies between data availability (transport data) and modelling running needs (geographic databases). In the final step, a combined trip distribution/traffic assignment model[20] is used. All these steps are further described in the next sub-sections.

[20] At present, the model analyses the commodity flows using only the road network, assuming the current mode split. Personal trips and other modes of transport are not the focus of the current model. For forecasting purposes, other mode split combinations can be used.

4.1.1. Step 1: Transport Data Generation

This step aims at transforming MRIO outcomes into raw transport data in terms of number of trips generated and attracted by each region, by commodity and road vehicle type. In summary, in a MRIO framework production is measured in economic quantities among regions, i.e. volume of monetary flow exchanged in selling and purchasing activities. However, the actual quantities transported on trucks, trains and ships are measured in physical units, such as tonnes of a certain commodity. Physical quantities are further translated into number of trips generated by each origin and destination.

Traditional transport models include trip production and attraction as a specific modelling step. So the number of trips is calculated through given socio-economic indicators (e.g. census data, income, land use). However in this thesis, the number of trips is directly estimated from the MRIO method (i.e. they will be considered as an input for the transport modelling activity), in order to take advantage of this economic analysis tool. Therefore, it is hypothesized that the MRIO can better represent the economic systems ruling transportation activities than traditional transportation modelling techniques; i.e. economic trade describes freight movement better than spatial socio-economic indicators. This approach has already been used previously by many authors, as described in subsection 2.3.2.

More specifically, MRIO models produce the total amount of intra-regional trade and the total amount of international and inter-regional trade, i.e. trade made within each region and domestic and overseas imports and exports. Nonetheless, specifics on the origins and destinations of such trading activities are not given by MRIO models; i.e. the place of origin and destination of goods and services cannot be distinguished, as explained in Chapter 3. The model's transactions include intermediate flows to production facilities, as well as flows to final demand sites inside and outside the region. Flows to and from residential sites are identified in the model as consumer's expenditures, which correspond to shopping trips. Export flows satisfy final demand outside the region, while import flows satisfy final demand within the region, as well as inputs to production processes.

Input-output principles state that the flow of sector i into region s equals the use of that commodity for producing other commodities (intermediate demand) plus regional consumption and investment (final demand) of region s, as in Equation 4.1.

$$\sum_r x_i^{rs} = \sum_j \left(a_{ij}^s \sum_r x_j^{sr} \right) + y_i^s \qquad \forall i, s \tag{4.1}$$

where x_i^{rs} represents the supply (in dollars) of a commodity i that the origin zone r provides to each destination zone s for the time period in question[21]. The term a_{ij}^s represents the technical input-output coefficients of zone s, y_i^s corresponds to the final demand for commodity i at zone s, and x_j^{sr} corresponds to the demand for commodity j from region r originated in zone s.

The Equation 4.1 states the material balance constraint, i.e. the conservation of flow between origin and destination regions and within regions. Also, regions are assumed to be indifferent regarding the source of the supply of commodities. This means that an industry's products are the same irrespective of production's place. This is not always true, as each place has its own characteristics of production, especially when dealing with agricultural products. For instance, the grapes produced in Marlborough are not the same as the ones produced in Hawke's Bay. This is because soil, climate and other features differentiate the outcome of an industry. Also, although both produce grapes, one is best known for its sauvignon blancs, rieslings and pinot noirs, while the other stands out for its chardonnays, cabernet sauvignons, syrahs, and merlots.

Data describing the relation between economic and physical quantities are scarce or overly expensive (Fosgerau and Kveiborg, 2004). Hence, a transformation needs to be made from pecuniary terms to physical terms, allowing the dollar values to be assigned as freight flows. The relationship between economic activity and transport is often described by a string of conversion factors, including commodity mixes, value densities, handling factors, average (avg.) length of haul, trip load factors, consignment sizes, etc. The sequence to transform economic activity in transport flows can be described by several stages, as depicted in Figure 4.2. The process describes the chain from production values by economic industries measured in fixed prices to freight transport flows in passenger car units (PCU), also called passenger

[21] For simplification's sake, the term commodity is used interchangeably with industry and sector in this thesis, because it is assumed that each industry or sector produces only one commodity; and region as the same meaning as subregion and zone of analysis (or area unit of analysis).

car equivalents (PCE). This conversion process is similar to the models described in McKinnon and Woodburn (1996) and Fosgerau and Kveiborg (2004), which have been adapted to this thesis.

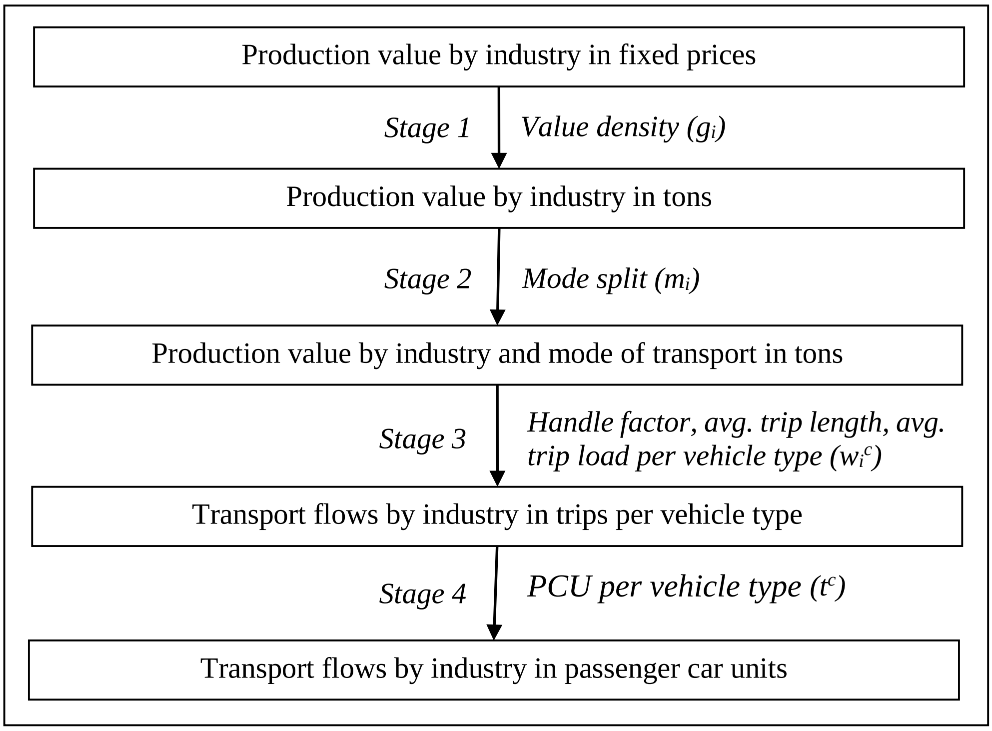

Figure 4.2. Economic activities and transport flows.

Source: Adapted from McKinnon and Woodburn (1996) and Fosgerau and Kveiborg (2004).

Freight transport models usually measure flows of goods in terms of tonnes, tonne-kilometres and/or vehicle-kilometres. In transport models that use I-O models for trip generation a conversion usually takes place from money units to tonnes, using fixed weight to value ratios (value density) (Batten and Roy, 1982). These ratios are usually based on mean values from the trade statistics and mean weights from the transport statistics for commodity classifications that are assumed to be uniform. The need to use value densities is one of the weakest points of freight models using the I-O approach, or indeed any other economic model. However, to include economic development, world market prices, production, consumption and trade in a freight transport model, the best possible way is to use an economic model (I-O, CGE) which give results of trade in money units.

A possible approach to convert dollar values of trade into number of trips is to use a ratio of monetary shipment value to trips made, by transport mode, vehicle type and sector.

Alternatively, if the total volume of trips made throughout a country by mode of transport and by industry is available, then this ratio is easily computed by dividing money values obtained in the MRIO by the number of trips. However, such trip information is rarely available from national statistics bureaus. Thus, trip data would normally have to be generated by other means, such as the total weight transported in the national territory and value of the shipments by sector or commodity. Subsequently, the total weight (in tonnes or other load dimension) needs to be transformed into number of trips by transport mode. Different sources of information can be found for developed countries: i) freight transport matrix by industry sector; ii) distribution information for the most significant industries; or iii) average load carried by trucks.

Given the available information, it is decided to use the ratio that converts commodity shipments from dollar values to weight of commodities (dollars/tonne) as g_i, the ratio that distributes commodity weight by mode of transport m as m_i, and the one that converts commodity weight by mode of transport to commodity trips by vehicle type c as w_i^c. Obtaining w_i^c. involves identifying the primary truck configurations and major truck body types, allocating commodities to truck body types that are used to transport these commodities, estimating average payloads by vehicle group and body type, and estimating the percent of empty truck trips.

Finally, the trips are converted to PCU (stage 4 of Figure 4.2). One passenger car corresponds to one PCU and different trucks sizes correspond to different PCUs. The conversion of trucks into PCUs, here called t^c, varies for different countries, but is normally between 1.2 and 5.0 PCUs, being 2 and 3 PCU/truck the most frequently used values (DfT, 2005, Taylor *et al.*, 2005). The stage 4 generates comparison between road capacities (measured in PCU/h) and traffic flow, defining congestion quotients. Each of these ratios (m_i , t^c , g_i and w_i^c) corresponds to one stage of Figure 4.2.

Hence, the final outcome is the transformation of MRIO outputs into trip attraction (*TA*) and trip production (*TP*), to and from each region by sector, as formulated in Equations 4.2 and 4.3, respectively.

$$\frac{\sum_r x_i^{rs}}{g_i . w_i^c} . m_i . t^c = TP_i^{c,m} \tag{4.2}$$

$$\frac{\sum_r x_j^{sr}}{g_j . w_j^c} . m_j . t^c = TA_j^{c,m} \tag{4.3}$$

In this study, *TA* and *TP* are estimated using sectors' inter-relationships, as a product of the MRIO models, transformed to transport data (tonnes and tonnes per trip). The transport intensity factor combines a handling factor measuring the number of trips made for each good, with average trip lengths and average trip loads. In physical terms, Equations 4.2 and 4.3 represent the quantity of goods shipped on the transportation network, in PCU by mode of transport, commodity and vehicle type.

4.1.2. Step 2: Geographic Data Acquisition and Treatment

GIS can greatly support transport modelling, offering the advantage of combining mathematical capabilities with spatial analyses and powerful visualization tools, thus, it was chosen as a modelling platform. Furthermore, geographic data is hereafter defined as any data that contains at least one data field to store location information.

The first step to acquiring geographic data is to make a quick analysis of the intended modelling efforts, because of its costs and difficulties of collection. When possible, it is desirable to collect the necessary geographic data, guaranteeing a good quality of data and that all needs are met. However, data collections have high associated costs and are most times not possible. Thus, data needs and possible data sources have to be assessed along with budgetary considerations, before data acquisition takes place.

After necessary data is acquired, which can involve collecting, purchasing or obtaining from public domain or other free data sources, it should be treated according to individual modelling needs. Treatment is of special concern in transport modelling endeavours, as many times geographic databases have not been designed and set up for transportation applications. In addition, modelling is strictly dependent on data availability and quality. Lack of data might impair or ultimately incur infeasible running routines and parameters calibration. Thus, transport models present the modeller with strict data needs and adjustments that can be time and resource consuming depending on the specific application.

The transport model formulated in this thesis requires economic data of the location to be analysed. A large area or nation is divided into several economic/political regions (e.g. states). Each region comprises one or more urban regions as well as many economic activities, such as agriculture, trade and services. Regional economic models encompassing both input–output and econometric relationships are presumed to be available for each region, describing the relationships between regional production by sector for regional consumption, investment and government, as well as exports to other regions.

Generally speaking, a typical transport database to conduct a network analysis of the impacts of fuel constraints should include the following.

- Georeferenced transportation network, which comprises a series of links and nodes. Links represent the actual transport structure (roads, bridges, railways, air routes etc) and nodes the physical connections amongst links. For the case of roading systems, links represent the physical infrastructure available for vehicles to travel (road sections) and nodes the intersections where roads combine or split.
- Zones (census or physical neighbourhoods), which represent areas with common features. These zones can be represented as a singular point namely centroid, i.e. simplification of an entire area into a point to facilitate the analyses.
- Characteristics of the links such as length, number of lanes, direction of flows in each lane, lane width and information on medians, lateral clearance distance and density of access points.
- Road information regarding road class, capacity, speed and travel time of network links.
- Corridor geometrics, including terrain type for each network link.
- Trip generation flows (at the desired level of geographic aggregation) by commodity and mode.
- Traffic counts on network links.

The first five items of the list refer to the georeferenced network and its characteristics. It is crucial to have a reliable network with the information on the links, such as distance, number of lanes, direction of flows, road capacity and speed. Without these data it would be impossible to complete a network analysis. The last two items of the list refer to the transportation data, regarding the movement of goods: trip attraction and trip production, by commodity and mode, and real traffic data to compare with the obtained flows.

The above list is not intended to be exhaustive, but to record the essential items, or the minimum required data to conduct transport modelling. The database could include additional information, depending on the intended level of analyses, which would make the models more accurate and of improved quality. The data below, for example, would give enough information to perform other tests on the network and guarantee a good match between modelled and real transport performance:

- Information on travel time reliability;
- Cost/impedance values associated with the various choice making processes, such as loading, unloading and handling the goods from one mode of transport to the other;
- Environmental factors;
- Accident data;
- Characteristics of seaports, airports, and rail and truck terminals;
- Multimodal transport network with the complete set of information listed on the typical transport database above described;
- Labour rates and pool size; and
- Fuel rates.

In the context of data treatment, the most problematic issue faced by transport modellers regards the realism of the network represented and its particularities. For instance, georeferenced road networks need to contain much specific information to precisely portray the real system. Nonetheless, the information is expensive and time consuming to obtain, so one needs to make simplifications. Also, sometimes the minimal characteristics of the network links are not available, and then data treatments and *ad hoc* adjustments are necessary to sustain minimum modelling needs.

For instance, in GIS platforms, links need to be correctly connected through their endnodes, and sometimes network connectivity needs be ensured manually. Similarly, traffic directions, number of lanes, speed-flow relationship, capacity or any other essential information might need to be manually added, and all treatments must to be tested to verify if a minimum level of accuracy is achieved. Network preparation is required to define and populate the attributes of the highway links that are necessary for freight assignment. These include travel impedance functions, free flow speeds, and link capacities. Such attributes determine the capacity-related performance characteristics of each link.

In summary, different treatment procedures need to be performed in order to make the geographic base ready to use. Finally, both data acquisition and treatment processes are to be defined by the modeller accordingly to specific circumstances dealt when performing this step. As previously highlighted, the activities presented are just an outline as the level of detail of available data determines different possible scenarios to treat them.

4.1.3. Step 3: Freight Transport Modelling

Boyce's combined modelling and forecasting approach (Boyce, 2002) to represent network users' behaviour was adopted in this step. This approach is described in the sub-section 2.3.2.3 and expressed by equations 2.30, 2.31 and 2.32. The steps to follow to conduct a Combined Freight Transport Model are:

- (i) examine the characteristics of the transport network in the study area, improving the network's information when needed;
- (ii) define the transport network (links and nodes) to be used in the modelling, and reduce the network where necessary to simplify the analysis;
- (iii) adjust free flow speeds;
- (iv) define a cost function for the transport network in the study area;
- (v) define the trip distribution method;
- (vi) define the estimation parameters (number of iterations, convergence criteria, dispersion, alpha, beta, constraint type, etc);
- (vii) estimate the model;
- (viii) assess the results of the model estimation (model parameters, errors, etc);
- (ix) evaluate the model's estimated results, which can include comparison to real data or target results in specific points of the network; collected or available data is desirable;

(x) examine the characteristics of the trip distribution in the study area;

(xi) create a desire lines thematic map to represent the trip distribution in the study area;

(xii) examine the characteristics of the trip length distribution in the study area; and

(xiii) go back to step (v) if the estimated results do not match observed data well, repeat it until the minimum error of one or a mix of parameters is obtained.

The main modelling assumption taken here is that the performance of the transportation system can be reasonably estimated at a strategic level of analysis. This assumption is ambitious in nature, because it is focused on representing macro interactions between supply and demand. The main motivation to adopt such a strategic level of analysis is the need to develop a modelling tool that could quickly predict the network user's behaviour without incurring extremely long model running periods, which are commonly observed in modelling efforts. At the same time, this thesis has a strategic approach, in which major interactions between economic sectors is analysed, as well as major strategic level policies are to be simulated.

A disadvantage of this model is that it only allows for the modelling of one type of network (road, rail, maritime), ignoring multimodal analysis. Nevertheless, several types of vehicles can be modelled, as long as they share the same network.

The free flow speed was adjusted by taking into consideration various geometric design features of the roadway, such as sight distance, vertical and horizontal alignment, lane and shoulder widths, roadside clearances and superelevation, which influence design speed and consequently free flow speed. Other variables can also affect travel speed, such as surface condition, no-passing zones, speed bumps, traffic signs, railroad crossings, kerbs height and distance to the road, light poles and trees near the roadway, climate and weather conditions, level of enforcement and lighting conditions (TRB, 2000, Kyte *et al.*, 2001).

4.2. Freight Transport Model: The New Zealand Case

This section describes the application of the proposed method using the results from Chapter 3 in addition to transport data acquired from New Zealand authorities: Statistics New Zealand (SNZ), New Zealand Transport Agency (NZTA), Land Information New Zealand (LINZ) and

Ministry of Transport (MoT). The three step model shown in Figure 4.1 is applied following a brief introduction about the country's freight transport activities in the next paragraphs. Finally, the model's results and shortcomings are discussed along with its theoretical framework.

New Zealand's transport infrastructure includes 10,909 km of state highways, with 99.7% of this amount (10,877 km) being sealed roads, and 83,001 km of local roads, of which 61,4% are sealed (51,002 km). There is also a rail track owned by Kiwirail that has a total length of approximately 4,000 km. The maritime infrastructure comprises 16 ports: Whangarei, Auckland, Tauranga, Taharoa, Gisborne, New Plymouth, Napier, Wellington, Nelson, Picton, Westport, Greymouth, Christchurch (Lyteltown), Timaru, Dunedin and Invercargill, of which two do not move freight: Taharoa and Greymouth. In addition, there are 7 international airports: Auckland, Hamilton, Rotorua, Wellington, Christchurch, Dunedin and Queenstown and many other smaller aerodromes that add up to about 70 airfields in total. Lastly, the country has about 2,827 km of pipelines, being 172 km for liquid petroleum gas, 288 km for oil, 198 km for refined products, 331 km of condensate pipeline and 1,838 km for gas (CIA Factbook, 2010).

New Zealand's current goods distribution is mostly done by roads. In the years of 2006 and 2007, approximately 92% of tonnage and 70% of tonne-km was transported by roads. Rail corresponded to 6% of tonnage and 15% of tonne-km, and coastal shipping to 2% of tonnage and 15% of tonne-km (Paling, 2009). Due to common New Zealand's economic activities, the four main primary industries (agriculture, forestry, milk and livestock) have a significant share of total freight movements, corresponding to approximately 25% of the total tonne-km. Additionally, over 71% of the total trip-end-estimated freight, in tonnes, occurs in the North Island within the regions of Auckland, Waikato, Bay of Plenty and Manawatu-Wanganui, which corresponds to more than 50% of tonnage. It is often argued in both practicising and academic settings whether the freight system is efficient or not in New Zealand considering its distribution by mode and organizational arrangements. It can be argued that indicators such as operational costs, delays and fossil fuel dependency all point to inefficiency and poor system reliability.

4.2.1. Step 1: Conversion of Input-Output Results to Transport Data

This step focuses on transforming New Zealand's MRIO outputs into trip generation data. For this purpose, a set of ratios representing the total weight of shipments by transport mode and industry sector had to be defined besides the processes described on Figure 4.2. Although such ratios were not readily available for New Zealand, it was possible to estimate them using other available data. The first procedure before the transformation of economic data into transport data is to reallocate imports and exports.

The MRIO framework only accounts for international trade used internally in each region and does not take into consideration the physical allocation of seaports and airports; i.e. each region uses/sells a certain proportion of imports/exports, even though this trade is not physically imported/exported in that region. Hence, data on the international trade of each port (Statistics NZ, 2010b, Statistics NZ, 2010a) was used to reallocate the imports and exports to the regions. In this way, if a region imports more than its regional consumption of imported products, the remaining trade was added to its freight production, as the region would send these products to other places. Higher level of imports by one region were treated as imports to other regions, and consequently they became part of the production of trips. In the same way, if a region exports more products than its local production of exports, the remaining trade was included as freight attraction of that region, because the products had to be brought into that region from other regions.

The procedure of reallocating imports and exports is only made when the MRIO is produced by non-survey methods. The regions' international imports and exports are calculated as a portion of the international trade consumed/produced regionally. Thus, a list of all major and minor ports of New Zealand, and the total amount of goods leaving and entering these ports was obtained. It was observed that Auckland is the largest import port, reflecting the significance of this city as the most populous and the major industrial region. Tauranga is the largest export port, probably related to its proximity to major forestry and agriculture related export industries. Napier is also a significant export port, due to the same reasons as Tauranga.

SNZ provided a database of the monthly imports and exports for each port, for a 99 commodity classification. The datasets were consolidated into the 26 producing industries, for the year ended March 2009. The 14 ports listed previously were allocated to the regions to which they belonged and the percentage of imports and exports that come into and depart from each region and industry were calculated. It was noted, for example, that the region of Auckland is responsible for the entrance of approximately 69.6% of the total imports of the country, followed by Bay of Plenty (Tauranga), with 10.7% and Canterbury (8.6%). The exports of the country were made predominantly through the region of Bay of Plenty, which represented 45.1% of the total country's exports, followed by Auckland (17.6%), Hawke's Bay (14.2%) and Canterbury (8.5%), as showed in Table 4.1.

Table 4.1: Percentage of imports and exports in New Zealand, year ended March 2009

Region	**% of Imports**	**% of Exports**
Northland	0.0%	0.9%
Auckland	69.6%	17.6%
Waikato	0.0%	0.0%
Bay of Plenty	10.7%	45.1%
Gisborne	0.0%	1.4%
Hawke's Bay	3.1%	14.2%
Taranaki	0.0%	0.7%
Manawatu-Wanganui	0.0%	0.0%
Wellington	4.7%	1.0%
Tasman	0.0%	0.0%
Nelson	0.6%	5.3%
Marlborough	0.0%	0.0%
West Coast	0.0%	0.0%
Canterbury	8.6%	8.5%
Otago	2.8%	4.8%
Southland	0.0%	0.4%
New Zealand Total	100.0%	100.0%

The next step was to select for analysis only the economic sectors that are mostly associated with goods flows. The original 51 sectors from I-O tables were reduced to 26 sectors, which represent the industries that generate freight movements. Even though the service sectors represent a substantial proportion of regional output, their ultimate purpose is to meet final demand needs. Similarly, the construction and the trade (retail and wholesale) sectors together describe a significant part of the total output, but a small quantity of freight would be directly generated by the industries within this category. The main reason for this is that they are service industries, not production industries. For example, it is expected that a big retail store would attract a great amount of trips from the suppliers (producing industries), but the generated trips from the retail store are from shoppers, so, are not freight trips, but passengers trips instead[22].

In this context, service industries do not produce flow of goods. Hence, they were excluded from the freight modelling. The exceptions are the construction and trade industries, as observed by Bolland *et al.* (2005), that identified how some industries affect the generation and attraction of freight. According to their study, construction generated 456 million tonne-km and trade (wholesale and retail), 539 million tonne-km. In this study, it is assumed that construction produced about 3,126 tonnes and trade generated 3,803 tonnes of freight transport, which is less than the generated by the paper products manufacturing industry, despite being more than 10 times bigger in pecuniary trade.

Following, indicators for the average economic value per weight (i.e. dollars/tonne) were estimated for different commodity shipments. Data representing the value and weight (tonnes) for exports and imports in a ten-digit Harmonized System (HS) Classification (i.e. data for 21.631 commodities) since 1989 is made available at SNZ database. Data for the years of 2003 to 2009 were gathered in order to allow a comparative analysis of the value density of commodities. Subsequently, the commodity database was aggregated and divided into the 26 I-O industries that generated freight. Table 4.15 presents the obtained value density, g_i, which corresponds to stage 1 of Figure 4.2.

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[22] Similarly, construction companies buy from other extracting and manufacturing industries, implying the movements of materials such as cement, sand, bricks, lumber and steel, but the industry does not sell products. Instead they provide building services of structures, which is not a physical good (Rodrigue *et al.*, 2009).

Table 4.2: Ratio of commodity shipments value to weight (NZD/tonnes).

Industry Grouping	NZD/tonne
Horticulture and fruit growing	1,950.6
Livestock and cropping farming	12,224.8
Dairy and cattle farming	3,152.6
Other farming	143.4
Forestry and logging	277.9
Fishing	5,040.4
Coal mining	113.2
FUEL	770.4
Other Mining and quarrying	101.2
Meat manufacturing	4,887.5
Dairy manufacturing	5,136.4
Other food manufacturing	2,277.7
Beverage, malt and tobacco manufacturing	4,509.5
Textiles and apparel manufacturing	6,839.9
Wood product manufacturing	1,510.5
Paper and paper product manufacturing	790.9
Printing, publishing and recorded media	11,054.7
Fertiliser and other industrial chemical manufacturing	818.5
Rubber, plastic and other chemical product manufacturing	4,393.5
Non-metallic mineral product manufacturing	2,101.2
Basic metal manufacturing	2,308.5
Structural, sheet and fabricated metal product manufacturing	10,647.0
Machinery and other equipment manufacturing	26,736.2
Furniture and other manufacturing	22,084.6
Construction	10,000.0
Wholesale and retail trade	12,000.0

The main assumption taken here is that the characteristics (types of products per industry) of domestically consumed products are similar to the imported and exported products. This assumption is made everytime an average g_i of a nation's internally consumed products is not available.

It is important to highlight that the I-O model considers the item 'transport' within the industry money flow, if it is made by own-fleet transport or for-hire carriers. If the transport is made by a for-hire carrier, then the money flow is included in the freight transport industry. Thus, all own-fleet (or ancillary) movements are here double-counted. To understand the impact of this on the analysis, two things must be known: the percentage of ancillary freight in total movements and the percentage of transport costs in gross outputs. It is observed that these proportions depend on the region, type of product, industry characteristics, available technology, distance travelled, etc.

According to the Ministry of Transport (2010), logistics costs represent around 8.4 percent of total turnover. According to Kemp *et al.* (2012), the average proportion of transport costs are 8.8% of total input costs and it varies from 4% to 14% of gross output of industries.

Regarding the importance of ancillary (or own-fleet) transport, little information was found for New Zealand. Kim (2014) observed that in USA 48% of road transport is made by own-fleet transport, while in Canada it is 45%. According to the European Comission (2011), the share of own-fleet transport in EU was only 15.2% in 2010. Kim's study identified that the percentage of own-fleet transport is about one-sixth of the total transport movements in New Zealand, varying significantly among the industries, being about 2.5% for wood products and approximately 23.5% for food-stuffs. The overall analysis is that for urban movements the total share of own-fleet transport is much higher than for inter-regional trade.

Following the estimation of the parameter g_i (stage 1), mode split was subsequently defined (stage 2). The National Freight Demand Study - NFDS (Paling, 2009) and the New Zealand National Freight Matrix - NZNFM (Bolland *et al.*, 2005) were considered as accurate sources to define how freight is transported in New Zealand by the different modes. Where these studies did not provide the required information, additional industry related reports and documents were consulted. Table 4.3 displays the mode split assumed for each sector.

Table 4.3: Mode split per industry

Industry	% Road	% Rail	% Coastal Shipping	% Other Transport Mode (air + Pipeline)
Horticulture and fruit growing	93%	7%	-	-
Livestock and cropping farming	100%	-	-	-
Dairy and cattle farming	100%	-	-	-
Other farming	98%	2%	-	-
Forestry and logging	94%	6%	-	-
Fishing	68%	30%	2%	-
Coal mining	36%	64%	-	-
FUEL	8%	-	40%	52%
Other Mining and quarrying	99%	-	1%	-
Meat manufacturing	57%	43%	-	-
Dairy manufacturing	89%	11%	-	-
Other food manufacturing	97%	2%	1%	-
Beverage, malt and tobacco manufacturing	97%	2%	1%	-
Textiles and apparel manufacturing	96%	3%	1%	-
Wood product manufacturing	97%	3%	-	-
Paper and paper product manufacturing	96%	4%	-	-
Printing, publishing and recorded media	100%	0%	0%	-
Fertiliser and other industrial chemical manufacturing	88%	2%	10%	-
Rubber, plastic and other chemical product manufacturing*	98%	2%	1%	-
Non-metallic mineral product manufacturing	100%	-	-	-
Basic metal manufacturing	80%	20%	-	-
Structural, sheet and fabricated metal product manufacturing	80%	20%	-	-
Machinery and other equipment manufacturing	90%	8%	2%	-
Furniture and other manufacturing	80%	15%	5%	-
Construction	100%	-	-	-
Wholesale and retail trade	90%	7%	2%	1%

* Due to rounding the percentages do not add to 100% for this industry. In this case, the mode split of roads is 97.5% and of coastal shipping is 0.5%

An information item that is important to the distribution of transport modes is the presence of other modes of transport among regions, considering that all regions are well served with the road network. Table 4.4 displays the presence of transport modes among regions based on the physical presence of freight facilities such as ports, airports, railways and pipelines (at the time of modelling[23]), for the correspondent modes of transport: coastal shipping, air transport, etc.

Table 4.4: Presence of transport modes per region

Region	**Rail**	**Coastal Shipping**	**Air freight**	**Pipeline**
Northland	Yes	No	No	No
Auckland	Yes	Yes	Yes	Wiri (fuel)
Waikato	Yes	No	No	Waikato North Head mine (ironsand)
Bay of Plenty	Yes	Yes	No	No
Gisborne	Yes	No	No	No
Hawke's Bay	Yes	No	No	No
Taranaki	Yes	Yes	No	Marsden Point (fuel)
Manawatu-Wanganui	Yes	No	No	No
Wellington	Yes	Yes	Yes	No
Tasman	No	Yes	No	No
Nelson	No	No	No	No
Marlborough	Yes	Yes	No	No
West Coast	Yes	No	No	No
Canterbury	Yes	Yes	Yes	No
Otago	Yes	Yes	No	No
Southland	Yes	Yes	No	No

Subsequently, the estimation of the ratio that converts tonnes per mode of transport by industry into number of trips generated and attracted by each economic region by industry and vehicle type is calculated. To do so, freight vehicle fleet configuration and usage needed to be considered in order to generate reliable indicators of average weight carried by vehicle type and industry.

In the particular case of New Zealand, freight vehicles are required to have a special licence which allows them to circulate on public roads according to an intended weight limit. This road tax is named as road user charges (RUC) and is applicable to vehicles over 3.5 tonnes manufacturer's gross laden weight and all vehicles powered by a fuel not taxed at source, e.g. diesel. The RUC data has information on the purchased license weight (W), RUC vehicle

[23] At the time of modelling there was a rail line between Napier and Gisborne, but it has been closed since March 2012 due to storm damage. Late in 2012 KiwiRail (the main public rail transport operator in New Zealand) officially mothballed the line from Wairoa (north of the Hawke's Bay region) to Gisborne. Similarly, the rail lines that connect Canterbury with the West Coast, Otago and Southland were closed for some time due to the Christchurch Earthquake, although there was considerable effort to restore them quickly, unlike for the Gisborne region.

class and RUC industry classification (i'). Each I-O industry was linked to one RUC industry - that is consistent with the RUC description - as illustrated in Table 4.5. The RUC industry of ‘Unknown’ was linked to the industries of fuel and wood, because these industries normally have their own trucks for freight transport and do not fit in the description of the other RUC industries. Hence, hereafter ‘Unknown’ is described as ‘Other’.

Table 4.5: RUC and I-O Industry concordance

RUC Industry i' / I-O Industry I	Agriculture / Forestry / Fishing	Commercial Road Transport	Construction	Manufacturing	Mining / Quarrying	Other	Wholesale / Retail Trade
HFRG	X						
SBLC	X						
DAIF	X						
OTHF	X						
FOLO	X						
FISH	X						
COAL					X		
FUEL						X	
OMIN					X		
MEAT		X					
DAIR				X			
OFOD		X					
BEVT		X					
TCFL		X					
WOOD						X	
PAPR		X					
PPRM		X					
CHEM		X					
RBPL		X					
NMMP		X					
BASM		X					
FABM		X					
MAEQ				X			
OMFG		X					
CONS			X				
TRDE							X

The freight vehicles were divided into 3 classes: MCV, HCV1 and HCV2. Following the New Zealand Transport Agency’s classification (2010d), MCV is any 2-axle truck without a trailer, with tonnes gross laden weight over 3.5; HCV1 is a rigid truck with 3 or 4 axles in total; and

HCV2 is a truck and trailer, or articulated vehicle with or without a trailer, with 5 or more axles in total. Thus, using data from RUC licences purchased by unique vehicles (i.e. maximum allowed weight), the average weight carried (payload) by trip for each industry class and license type according to the registered vehicle fleet, w_i^c, was calculated and is shown in Table 4.6. The MoT releases annually a set of transport sector-related indicators, and the average load (tonnes) of heavy vehicles for the year 2010 was 6.9 and for the year 2011 was 7.1. In the Canterbury region the average load for heavy vehicles is about 7.5 tonnes.

Table 4.6: Percentage of trips and average weight carried by vehicle type

Industry *i'*	**Percentage of trips per vehicle type**			**Average Weight Carried by vehicle type (tonnes)**			**Total Average Weight Carried (tonnes)**
	MCV	**HCV 1**	**HCV 2**	**MCV**	**HCV 1**	**HCV 2**	
Agriculture / Forestry / Fishing	28.5%	12.7%	58.7%	5.21	12.47	23.91	16.79
Commercial Road Transport	13.7%	19.8%	66.5%	6.45	12.62	23.79	18.78
Construction	32.7%	14.9%	52.4%	4.85	13.79	25.71	16.78
Manufacturing	33.9%	5.3%	60.8%	4.32	11.9	22.33	15.42
Mining / Quarrying	14.9%	20.2%	64.9%	5.02	13.13	25.02	19.19
Other	29.5%	6.5%	64.0%	6.25	13.12	24.47	18.07
Wholesale / Retail Trade	58.9%	3.2%	37.9%	4.27	11.89	23.01	11.38
Total average	24.7%	14.8%	60.5%	5.21	12.74	24.09	17.39

Following the procedures described above and using the above-mentioned data sets for New Zealand, the number of trips per vehicle type and industry classification was estimated. Lastly, stage four of Figure 4.2 can be performed, in which truck trips are transformed into PCU movements. In New Zealand, the PCU equivalents were available according to terrain types (level, rolling and mountainous) and road types (rural, motorway) and not for truck types. So, international standards of PCU equivalents for vehicle types were adapted to the country (Taylor *et al.*, 2005). The final conversion factor for each vehicle class from PCU per vehicle, t^c, was implemented as in Table 4.7. Finally, transport flows by industry in PCUs were calculated for each vehicle class. Table 4.8 and Table 4.9 display the total freight produced and attracted by region and industry, without any differentiation of vehicle types.

Table 4.7: Passenger car units per vehicle class

Vehicle Class	PCU/vehicle
MCV	1.8
HCV 1	2.0
HCV 2	3.0

Table 4.8: Total freight PCU produced by region and industry in 2009.

Regions \ Vehicles Industry	Agriculture / Forestry / Fishing	Commercial Road Transport	Construction	Manufacturing	Mining / Quarrying	Other	Wholesale / Retail Trade	TOTAL	% of Total
Northland	346,033	127,129	11,693	6,918	38,557	151,944	15,307	697,581	5.7
Auckland	462,448	1,200,026	135,947	133,368	123,815	114,993	332,874	2,503,471	20.4
Waikato	733,630	234,376	54,017	40,356	226,906	75,628	52,063	1,416,975	11.6
Bay of Plenty	580,128	272,129	26,679	26,802	63,562	73,945	46,686	1,089,932	8.9
Gisborne	188,142	16,389	3,541	5,567	3,979	7,160	4,676	229,455	1.9
Hawke's Bay	370,490	181,439	11,940	43,502	19,504	32,937	19,299	679,110	5.5
Taranaki	92,382	111,106	54,017	35,249	1,239,539	17,691	9,517	1,559,502	12.7
Manawatu-Wanganui	274,311	101,734	25,197	20,076	46,946	21,331	32,106	521,701	4.3
Wellington	157,756	203,542	51,958	24,381	53,002	29,696	118,581	638,916	5.2
Tasman	177,505	14,732	4,117	4,569	15,778	15,448	4,749	236,898	1.9
Nelson	18,723	31,156	4,282	9,345	2,071	11,409	8,172	85,157	0.7
Marlborough	108,001	34,887	5,023	13,176	6,190	3,370	4,956	175,603	1.4
West Coast	65,350	10,562	5,023	2,866	192,479	13,777	3,377	293,434	2.4
Canterbury	570,147	353,504	55,252	62,079	60,743	41,299	85,611	1,228,635	10.0
Otago	236,966	90,977	27,173	26,120	102,134	15,585	24,782	523,737	4.3
Southland	176,221	110,620	12,598	15,483	43,993	7,582	15,411	381,908	3.1
TOTAL	4,558,232	3,094,308	488,456	469,858	2,239,199	633,797	778,167	12,262,016	100.0

Auckland represented 20% of the total trips produced, with around 40% of the trips produced by the industries of commercial road transport and wholesale/retail trade and 28% of the construction and manufacturing trips. The Taranaki region produced 55% of the mining trips. In terms of production of freight the five most important regions were (in decreasing order) Auckland, Taranaki, Waikato, Canterbury and Bay of Plenty.

Table 4.9: Total freight PCU attracted by region and industry in 2009.

Regions \ Vehicles Industry	Agriculture / Forestry / Fishing	Commercial Road Transport	Construction	Manufacturing	Mining / Quarrying	Other	Wholesale / Retail Trade	Total	% of Total
Northland	331,359	123,864	11,693	6,463	33,405	151,953	15,050	673,786	5.5
Auckland	379,572	1,118,901	135,947	131,117	226,754	99,545	326,787	2,418,623	19.7
Waikato	711,966	227,062	54,017	37,377	197,958	71,918	51,189	1,351,486	11.0
Bay of Plenty	663,275	337,868	26,679	32,237	60,287	86,671	43,645	1,250,663	10.2
Gisborne	178,756	15,353	3,541	5,089	3,533	9,321	4,598	220,191	1.8
Hawke's Bay	354,491	184,020	11,940	39,746	15,018	33,167	18,975	657,357	5.4
Taranaki	93,980	138,374	54,017	32,347	1,100,490	16,049	13,912	1,449,170	11.8
Manawatu-Wanganui	266,877	98,575	25,197	18,475	40,957	21,394	31,567	503,042	4.1
Wellington	156,011	219,215	51,958	22,680	45,932	26,940	116,621	639,357	5.2
Tasman	167,737	13,679	4,117	4,176	14,019	14,027	4,669	222,424	1.8
Nelson	78,038	27,499	4,282	8,373	1,767	22,542	8,035	150,535	1.2
Marlborough	102,897	33,139	5,023	12,047	5,404	3,224	4,874	166,607	1.4
West Coast	63,314	9,595	5,023	2,636	167,923	16,086	3,321	267,898	2.2
Canterbury	558,787	341,172	55,252	57,711	200,116	37,258	99,760	1,350,056	11.0
Otago	277,852	111,080	27,173	45,251	89,162	16,619	24,368	591,505	4.8
Southland	173,320	94,912	12,598	14,131	36,475	7,082	10,797	349,316	2.8
TOTAL	4,558,232	3,094,308	488,456	469,858	2,239,199	633,797	778,167	12,262,016	100.0

Again, Auckland was responsible for aproximately 20% of the total trips attracted and for more than one quarter of the trips attracted by most industries, except mining, agriculture and other (fuel and wood). Likewise, in terms of freight attraction the five most important regions were Auckland, Taranaki, Waikato, Canterbury and Bay of Plenty, in this order. Taranaki attracted 49% of the mining industry production, but attracted less freight than Waikato and Canterbury in all the other industries. Additionally, Northland generated 151,953 trips to 'Other' industries, that is about 24% of the trips of this industry. Although Wellington region has the third largest city in the country, it does not stand out in terms of freight production or attraction, due to its high services profile.

4.2.2. Step 2: Geographic Data Acquisition and Treatment

In this thesis, the projection system adopted is New Zealand Transverse Mercator (NZTM 2000), which is based on the New Zealand Geodetic Datum 2000 (NZGD2000). Three geographic databases (New Zealand economic regions, State Highway centreline and traffic counts) were acquired and treated as follows so the GIS could be set up to run the modelling routines proposed thereof.

It was decided to use the GIS engine named TransCAD[24], which has special extensions for transportation, in a single and integrated platform. To run the combined model procedure, the above steps of trip generation and geographic data acquision and treatment need to be completed. More specifically, three network node attributes are required.

Table 4.10: Required network node attributes to run a combined model

Attribute	**Type**	**Contents**
Node Type	Integer	Code of node types
Production	Numeric	Number of trips produced by each zone (centroid node)
Attraction	Numeric	Number of trips attracted to each zone (centroid node)

In the node layer, the value of the Node Type field of all centroid nodes must be equal to one value, and the value for all non-centroid nodes must be different from the value of centroid code. In terms of link attributes, links' speed, travel times and capacity need to be correctly estimated. In addition, link parameters (alpha and beta) to fit the relationship to the observed traffic flow characteristics, as well as pre-load volumes (if any), need to be estimated.

It was assumed that the traffic was homogenously spread throughout the day and year and peak periods were ignored. Although, there is peak period congestion in urban areas, particularly Auckland, as well as Wellington, Christchurch, Tauranga and Hamilton (Rockpoint *et al.*, 2009), the peak is normally observed for passengers cars. Heavy freight transport, on the other hand, could try to avoid travelling in congested areas. Thus, for simplification purposes and for the strategic viewpoint this thesis has, the traffic in the network was considered constant through the day and year, across the 24 hour period. Additionally, the annual traffic was divided by 365 days, because the Annual Average Daily Traffic (AADT) was also calculated by dividing the annual traffic by 365 days. Nevertheless it does

[24] TransCAD is not the only option, but it was found to be the best alternative to run a combined model in a GIS platform. TransCAD is recommended because it is not only a GIS, but also because it has a wide collection of transport modelling tools, and provides a procedure to solve the combined trip distribution and traffic assignment problem.

not greatly influence the results, as both observed and estimated values were originally in annual quantities and were divided by 365.

4.2.2.1. Geographic Data Acquisition

Three geographic data sets were acquired for the purpose of this research. They and the treatment measurements to ensure data sets could be used in the final modelling step, were as follows.

- Regional Economic Boundaries and New Zealand Coast Line: A digitised database of New Zealand Regional Councils, defined according to Statistics NZ, and maintained by LINZ. It covers the digital boundaries of the land area of New Zealand, including the 12 mile limit[25] and the Chatham Islands. The Chatham Islands were excluded and the other 16 regions were considered.

- Road Centreline: This database has been originally derived from the road network representation available from LINZ. A private owned company (Koordinates[26]) has extensively updated, improved and added value to LINZ's road data set by both correcting mistakes and incorporating valuable additional data (e.g. road class, speeds). Koordinates published the base, as well as converted it to a geographical layer format, so it could be opened directly in most available GIS platforms. Furthermore, as required for transport modelling, the base contains two layers: i) endpoints representing the nodes - limits of links, and ii) road centrelines represented by links which store data about the characteristics of the road segments. Figure 4.3 illustrates the New Zealand coastline and road network layers (LINZ, 2010). The links also had information on the road characteristics: length, average speed and road class. The average speed is an attempt at capturing the 'actual' average speed a vehicle would travel on a given road, and had 8 classes, varying from 5km/h (class 0) to no limit (class 7); being from 1 to 6: 20km/h, 40km/h, 60km/h, 80km/h, 100km/h and 110km/h. However, it was given according to average speed of light vehicles and could be

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[25] 12 mile limit is a belt of coastal waters extending at most 12 nautical miles from the baseline of a coast line.

[26] Koordinates is a private owned company that provides geographic data for New Zealand and other places.

different than the heavy vehicles speed. The road class was divided into residential, collector, arterial, principal highway and major highway.

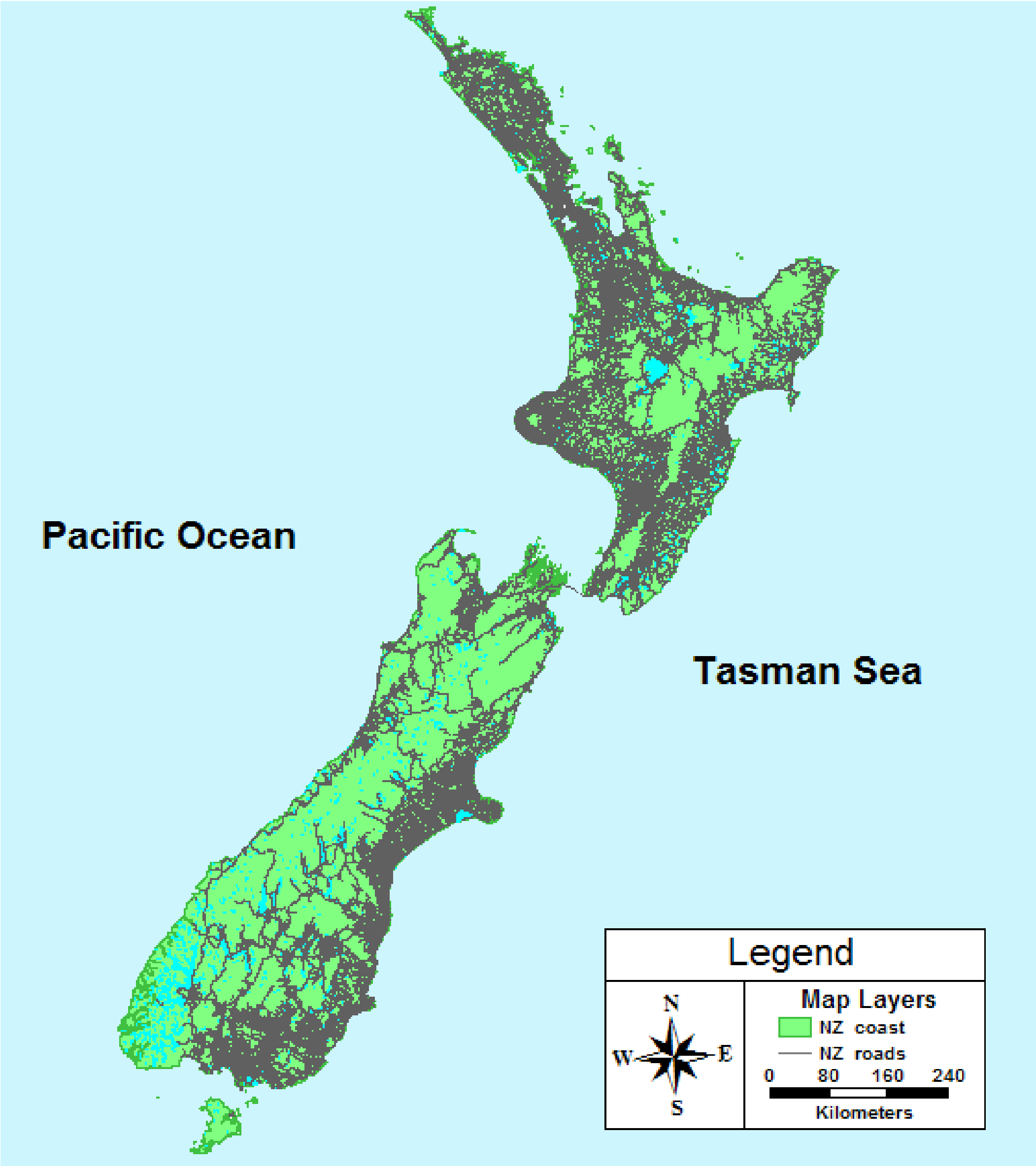


Figure 4.3: New Zealand's road centreline, lakes and coastline layers.

- NZTA Traffic Count Data: NZTA provides traffic counting for members of the public under special request. NZTA's traffic monitoring programme collects data throughout the whole state highway network with the purpose of planning, developing and maintaining the system. In this respect, AADT for the years of 2007, 2008 and 2009 were requested from NZTA. Traffic counts for 1,840 management stations were provided including: i) region, ii) site reference, iii) New Zealand Map Grid East, iv) New Zealand Map Grid North, v) site description and vi) Traffic Count (Total AADT, Car, Low Commercial Vehicle, Medium Commercial Vehicle, High Commercial Vehicle 1, High Commercial Vehicle 2 and Total High Commercial Vehicle).

NZTA’s traffic count database contained spatial information, which was processed to be used in the GIS. Thus, the database was transformed into a geographic file format in order to match with the representation used in the Road Centreline layer. Finally, a point layer was created representing the locations, where traffic data was collected and stored according to the NZTA’s traffic monitoring system.

4.2.2.2. Data Treatment

In order to ensure that databases were ready to be used for transport modelling activities, a final stage of data treatment was performed. In summary, databases were arranged according to modelling requirements. Centroids were defined according to the location of the most prominent economic centres for individual regions. Finally, the New Zealand coast line was exclusively used to allow a better visualization of the country and of regional boundaries, as well as modelling results. Table 4.11 shows the 16 regions and the cities chosen as their centroids.

Table 4.11: Cities used as centroids of the regions

Region	**Centroid**
Northland	Whangarei
Auckland	Auckland city
Waikato	Hamilton
Bay of Plenty	Tauranga
Hawke's Bay	Napier
Gisborne	Gisborne
Taranaki	New Plymouth
Manawatu-Wanganui	Palmerston North
Wellington	Wellington
Tasman	Richmond
Nelson	Nelson
Marlborough	Blenheim
West Coast	Greymouth
Canterbury	Christchurch
Otago	Dunedin
Southland	Invercargill

For the specific case of this research, only national highways and major urban roads were considered (major highways, principal highways and arterial roads). Hence, the remaining road classes were excluded from the New Zealand's Road Centreline database. The arterial roads were filtered in order to maintain only the links that connect highways or give access to ports, airports or other freight facilities, and ultimately better represent the road network. Figure 4.4[27] illustrates the database after excluding unnecessary road classes for the given study. Such process resulted in reducing the original network from 10,118 links and 9,620 nodes to 2,831 links and 2,601 nodes. The final network has 9,874.6 km of roads, being 9,5552.2 km of highways, 36.6 km of arterial roads, 2.5 km of local roads, 96.2 km of ferry and 187.1 km of centroid connections.

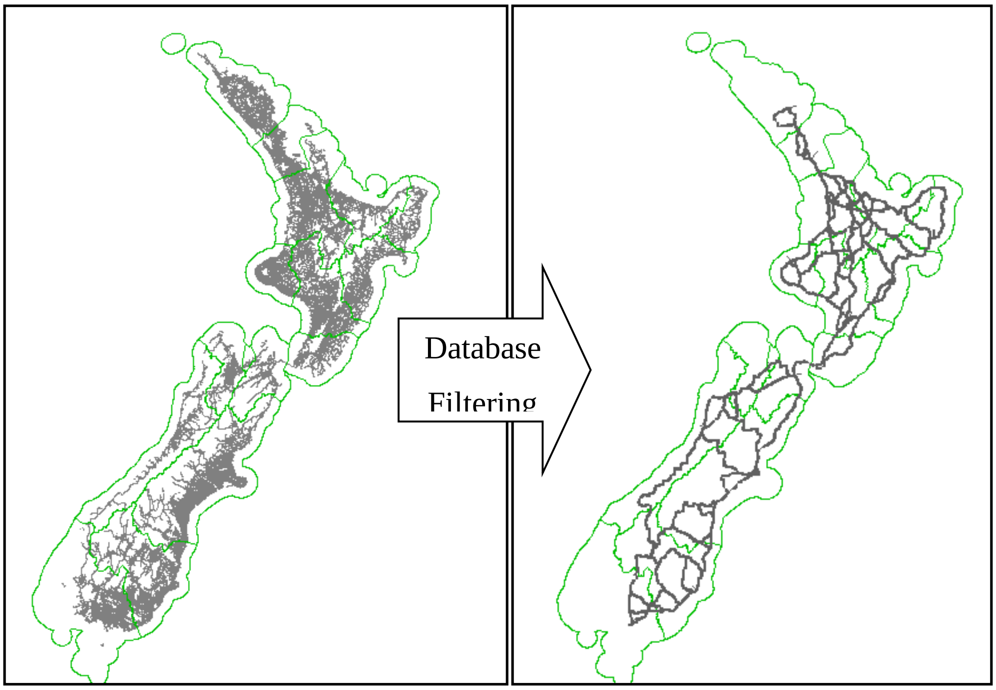


Figure 4.4: Road network filtering process.

In addition, the road capacity and travel time of each link needed to be calculated. Travel time was estimated for each link by assuming the speed as 85% of the nominal speed and link capacity, as indicated by the Economic Evaluation Manual – Volume 1 (EEM1) (NZTA, 2010b). For the sake of simplification all motorways and multi-lane roads were considered to

[27] The green external line in Figure 4.4 represents the territorial limit of New Zealand, i.e., includes the land territory and the belt of sea adjacent to the coast out to a distance of 12 nautical miles from prescribed baselines (called territorial sea).

have the same basic lane capacity. In addition, only about 15% of the capacity was dedicated to commercial vehicles, which is based on the fact that about 15% of all flow (PCU) registered on traffic count sites were relative to trucks (MCV, HCV1 and HCV2). More specifically, freight vehicles represented 16.5% of the PCU of all 1,828 traffic counting sites, 14.2% of the PCU of all sites that were of the type continuous, virtual or combined and 8.2% of the AADT of all sites. Table 4.12 presents the basic capacity for all road classes used, adjusted from the EEM.

Table 4.12: Basic capacity of roads

Road section	**Basic Capacity**
Motorways and Multi-lane roads	2.250 PCU/h per lane
Other urban road, Road Class I	1.200 PCU/lane/hour
Other urban road, Road Class II	900 PCU/lane/hour
Other urban road, Road Class III	600 PCU/lane/hour

Note: PCU stands for passenger car unit.

As observed in Table 4.12, road capacity is calculated in passenger car units (PCU) per lane. As previously highlighted, the road network has information on the road class and number of lanes (details of the number of lanes are given in section 4.2.4). For this reason, the number of trips per vehicle type was converted to PCU, as in stage 4 of Figure 4.2 and reported by Table 4.7. Additionally, NZTA traffic counts database had to be processed. The 1,828 management stations were reduced to 92 points, with the stations in urban areas being excluded. Also, in many cases several stations were found in the same link, or in the same corridor, i.e. in the same state highway connecting two regions that did not have any other road connecting to it. In these cases the modelling would produce only one result, therefore the need to exclude redundant points. Additionally, the minor connecting links in the network were also eliminated from the analysis, which left 92 traffic counting sites.

The above-mentioned processes culminated in appropriate geographic files, which allowed the freight transport model for New Zealand to be performed. Modelling details are presented in the next sub-section.

4.2.3. Step 3: Freight Transport Modelling

Initial tests were performed for a number of scenarios so parameters could be assessed in terms of their influence in the model's performance. It was observed that typical values of α and β were not sufficiently appropriate to estimate real travel time on links. Traditionally, α has been adopted to be between 0.05 and 0.20 and β to be between 4 and 10 (HRB, 1965). In this way, maximum impedance caused by α and β would be 1.20[28] times the free flow travel time, if $V = C$ (observed flow equal capacity). The original formulation of generalized travel cost, given on Equation 2.32 is represented in Equation 4.4.

$$t_a = t_{0a}\left[1+\alpha\left(\frac{V_a}{C_a}\right)^{\beta}\right] \tag{4.4}$$

where:

t_a = travel time on link *a* (generalized travel cost);

t_{0a} = free flow travel time on link *a*;

V_a = volume (flow) on link *a*;

C_a = capacity of link *a*; and

α, β = link parameters that are estimated to fit the relationship to the observed traffic flow characteristics.

Road geometric characteristics (grade and curvature) were more important than the congestion factors for freight traffic travel time cost function, as vehicle interactions are only critical when *V/C* is higher than 0.7 (NZTA, 2010b). Here, vehicle interaction is called impedance. Nonetheless, freight transport in New Zealand is not heavily constrained by road capacity. After running several scenarios it was observed that *V/C* were small, i.e. traffic flows on links were small compared to link capacities, being the ratio below 0.7 for all links. In addition, the freight movement activity can be logistically adjusted to avoid peak times, traffic time restrictions, etc.[29] Table 4.13 summarizes the estimates of the α and β parameters. High

28 This value was obtained by substituting $\alpha = 0.20$, $\beta = 10$ *and* $V/C = 1.0$ on Equation 4.4.

29 Long haul freight drivers modify travel habits during commuter peak periods to avoid peak traffic volumes. These changes can vary depending on conditions and if it is a recurring congestion. They do this by arranging their resting time and break periods when rest facilities and supporting amenities are available. This is only possible when there is flexibility at loading and unloading docks.

impedance was assumed for known congested areas, and medium impedance was assumed for links with some interaction with urban areas and commuting sites.

Table 4.13: Estimated α and β link parameters.

Road Type	α	β
Arterial High Impedance (AH)	2.00	1.00
Arterial Medium Impedance (AM)	1.00	2.00
Arterial Low Impedance (AL)	1.00	3.00
Motorway High Impedance (MH)	1.20	3.00
Motorway Medium Impedance (MM)	0.50	3.00
Motorway Low Impedance (ML)	0.20	3.00
Highway High Impedance (HH)	1.80	4.00
Highway Medium Impedance (HM)	1.50	4.00
Highway Low Impedance (HL)	0.80	4.00
Toll Road	20.00	1.00
Ferry/Centroid connectors	0.05	10.00

The term $\alpha(V/C)^{\beta}$ corresponded to an average of 0.3% of the generalized travel cost. The remaining 99.7% relate to the free flow travel time. Note that Equation 4.4 excluded the term relating to the equivalent travel time applied to road tolls, which was present in Equations 2.29 and 2.32. In Equation 4.4 the delay/cost of tolls was adjusted on the values of α and β, as shown in Table 4.13.

In terms of capacity constraints in New Zealand, the study by Rockpoint *et al.* (2009) states that they are mainly associated with congestion in urban areas, particularly within Auckland and other urban centres, as illustrated in Figure 4.5. According to the authors, the movement of freight in busy urban areas contributes to congestion, and the low traffic speed in peak periods often affects the efficiency of the heavy vehicle movements. Nonetheless, the proportion of heavy vehicles is typically low in urban areas, at only about 5% of the AADT.

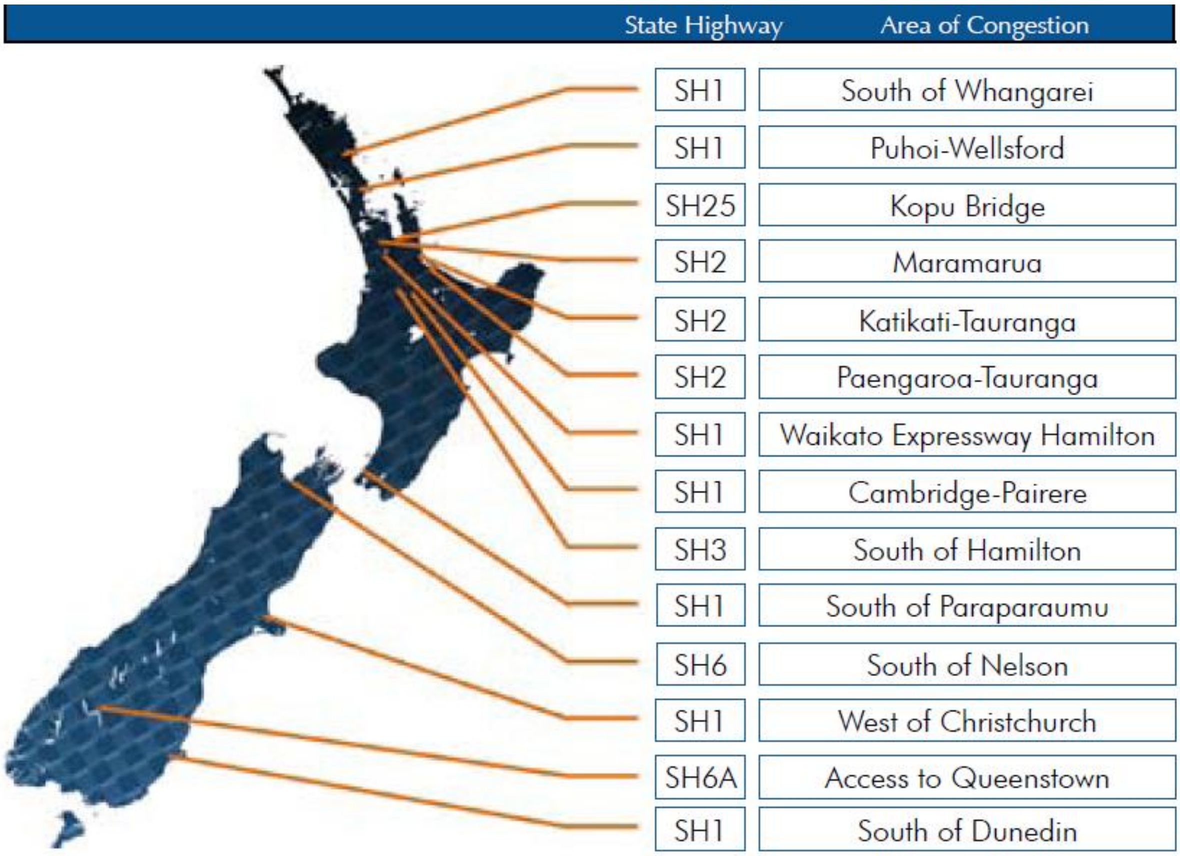


Figure 4.5: Areas of congestion on the state highway.
Source: Rockpoint *et al.*, 2009.

As shown in Figure 4.5, congestion is noticed in approaches to main urban areas and suggests other bottlenecks in the network (e.g. South of Nelson). In Auckland city, in one of the key links of freight movement, serving very large distribution centres, the proportion of heavy commercial vehicles is approximately 15% of the total flow for the average weekday, and in other main manufacturing areas the share of heavy vehicles is about 7% of daily flows (Rockpoint *et al.*, 2009). They state that when possible road transport operators minimize their exposure to difficult operating conditions on the most congested areas. However, due to delivery demands and time restriction it is not possible to avoid busy periods completely, but the proportion of heavy vehicles is higher in off-peak times in areas without restrictions.

It is observed that the time taken to drive a certain link can be as high as 2 times the free average speed travel time even in non-congested areas, especially for the movement of heavy vehicles, that generally drive at lower speeds than the average. The reasons for such differences between real travel time and average travel time are related to the characteristics of the network and the New Zealand geographic terrain, which in some areas are particularly winding and hilly.

Thus, the free flow travel time is not only a function of average speeds and distance, but also other road attributes that affect travel time without the presence of vehicle interactions, such as grade and horizontal curvature. This new parameter is here called adjustment factor, Ω, and it was added to the link attributes. Thus, the formulation of free flow travel time is given in Equation 4.5.

$$t_{oa} = \left(\frac{d_a}{s_a}\right) \cdot (1 + \Omega_a) \qquad (4.5)$$

where:
d_a = distance (length) of link a;
s_a = average speed of link a; and
Ω_a = travel time adjustment factor of link a.

Table 4.14 shows the given travel time adjustment factor according to the horizontal curvature and vertical grade of roads, and its percentage distribution on the network. The adjustment factor, Ω_a, could also include other road characteristics such as lane width, shoulder width, median width, surface condition, sight distance, no-passing zones, urban interference and other potential road obstacles/conflicts (speed bumps, traffic signs, railroad crossings, kerbs, light poles and trees near the roadway etc), as well as climate (dry, rainy, dry than rainy). This is because road geometry can greatly influence vehicle speeds, especially those of heavy vehicles.

The definitions of each road geometry class are described in Table 4.14, along with the proportion of class in the network. The classification of the network was done using satellite images and previous knowledge of the sites from driving experiences. The Highway Capacity Manual (TRB, 2000), the Highway Development and Management (Odoki, 2000) and other publications of the Federal Highway Administration (D.W. Harwood, 2000, Kay Fitzpatrick *et al.*, 2000), were also used.

Table 4.14: Travel time adjustment factor values and distribution on the network.

Road characteristics	**Adjustment factor** Ω	**Distribution on the network**
Extreme: Road segments with very high slope and/or very low-radius horizontal curves, low sight distance, many no-passing zones, left shoulder lateral clearance less than 1.0 m	0.90	0.2%
High: road segments with medium/high slope, low-radius horizontal curves, low sight distance, many no-passing zones, left shoulder lateral clearance less than 1.2 m	0.60	0.1%
High-Moderate: road segments with medium /high slope, medium-radius horizontal curves, normal sight distance, many no-passing zones	0.45	0.3%
Moderate: road segments with medium/high slope, high-radius horizontal curves, normal sight distance, some no-passing zones	0.30	18.3%
Moderate-Low: road segments with medium/low slope, medium-radius horizontal curves, good sight distance, few no-passing zones	0.15	21.1%
Low: road segments with medium/low slope and medium/low-radius horizontal curves, good sight distance, very few no-passing zones	0.075	29.0%
Very Low: flat and plain road segments	0.00	31.0%

Seven values of the adjustment factor were used, as shown in Table 4.14. Two main aspects were analysed to classify the road segments: the horizontal curvature and the vertical grade. The intensity of the horizontal curves increase from radii of 200m to 600m or more, and were classified as follows: <250m (very low), between 250 and 350m (low), between 350 and 400m (medium), 400 m or more (high). According to Wanty and Sleath (1998), in New Zealand there is one horizontal curve of 750 metres or less for every two kilometres of state highway, and about half of these curves have a radius of 250 metres or less.

The road slope was classified as follows: very high (mountainous) where gradients were typically 5% or more; high where gradients were typically 4% or more; medium where road gradients were typically about 3% (rolling terrains); low where road gradients were typically between 1.5% and 3% (level terrains); flat where gradients were typically less than 1.5%.

Few links had perceived values of travel time adjustment factors equal or higher than 0.45 (0.6% of links). Thus, Ω_a was responsible for about 9.2% of the generalized travel cost, in average (standard deviation of 8.4%).

After all the adjustments, individual modelling runs generated two main outcomes: i) O-D Matrix: number of trips (PCU) estimated between each pair of origin and destination, by vehicle type and industry and ii) Link Flows: traffic flow assigned to all road network links. Using data collected from NZTA's Traffic Management Programme, estimated and observed traffic flows were compared and performance measurements were calculated. The adopted performance measurements were in accordance to the EEM1 (NZTA, 2010b), such as link volumes, GEH Statistics, % RMSE (root mean square error) and journey time and speeds. The GEH Statistics and the RMSE were calculated as described by Equations 4.6 and 4.7.

$$GEH_a = \sqrt{\frac{2(q_{\mathrm{mod}a} - q_{obsa})^2}{q_{\mathrm{mod}a} + q_{obsa}}} \tag{4.6}$$

$$\% RMSE = \frac{\sqrt{\dfrac{\sum_a (q_{\mathrm{mod}a} - q_{obsa})}{n-1}}}{\left(\dfrac{\sum_a q_{obsa}}{n}\right)} \times 100 \tag{4.7}$$

where:

$q_{\mathrm{mod}a}$ = modelled hourly flow in link a, in PCU/h;

q_{obsa} = observed hourly flow in link a, in PCU/h; and

n = number of counts.

The GEH statistic is a form of Chi-squared statistic that is designed to be tolerant of larger errors in low flows. It may be computed for individual hourly link flows and also for hourly screenline flows. The GEH statistic thresholds stated in the EEM 1 - Economic Evaluation Manual – Volume 1 (NZTA, 2010b) have the following form:

- Only 40% of individual link flows should have GEH greater than 5.0.

- Only 5% of individual link flows should have GEH greater than 10.0.
- All individual link flows should have GEH less than 12.0
- Screenline flows should have GEH less than 4.0 in most cases.

Unlike the GEH statistic (which applies to individual flows and screenlines), the root-mean-square error (RMSE) applies to the entire network. Note that the RMSE formulation presented in Equation 4.7 is different from the *RMSD* and *RMSPE* formulations shown in Equations 3.13 and 3.14. In general, the RMSE should be less than 30%, but higher values are accepted in specific cases. Additionally, according to the EEM1 (NZTA, 2010b), if data on actual Vehicle Kilometre Travelled (VKT) are available, measurements of modelled VKT in the study area should be within five percent of observed VKT.

Modelled journey time and speeds were compared to available online sources, which only produced average observed travel time and speeds for passenger cars. It is usual that passenger-car speeds and travel times are similar to heavy vehicles speeds and travel times. However, this assumption was not realistic for some areas of the network, where the terrain is too winding and hilly, and which were corrected using the adjustment factor Ω. On the links with Ω equal to or more than 0.3, a sample was taken to test data reliability. Manual tests were performed measuring the difference between the modelled travel time and the observed travel time. A tolerance of 15% difference was considered acceptable and greater errors were corrected by rectifying the values of Ω.

Link flows were analysed, where a map of the network showing modelled and observed link volumes and the differences between them was produced. Given the recognised potential for error in the traffic counting method and/or in the sampling method, which results in divergence between modelled and observed volumes, an allowance for error in observed volumes should be allowed when judging the fit of the model (NZTA, 2010b). According to the EEM1, a reasonable error tolerance for hourly volumes on most individual major links (i.e. links carrying more than 15,000 vehicles per day in one direction) would be approximately 20%. However, the freight model only considers freight traffic and the amount of flow is considerably smaller. For instance, the maximum observed flow in one link was about 250 PCU of goods vehicles. In links carrying less traffic, the error tolerance should be greater, and the GEH statistic is designed to achieve this.

In addition, due to the availability of observed flow for each vehicle type, industries were combined and trip generation data was inserted for the three vehicle classes (MCV, HCV1 and HCV2). Running the model three times, total modelled flows were compared to real traffic volumes. Also, to have a better model analysis and allow for converting the modelling results into TKU – tonne kilometre travelled, the trip generation was also inserted for each industry (RUC industry), which means running the model another seven times.

4.2.4. Data Limitation Implications

The above description summarizes the procedures to obtain and treat the data in order to model freight movements in New Zealand. Discussion of some data issues is compressed in the sections above. This subsection presents some of the challenges, the solutions adopted and options for improvement. The aim is to help future modellers and researchers when handling similar challenges with data availability, as well as to explain some of the decisions and simplifications taken.

One problem throughout the New Zealand application was the number of existing industry and commodity classifications and the compatibility among them. For instance, there was no direct compatibility between the HS classification, used to classify internationally traded products, and the National Accounts Working Industries (NAWI), which is employed to classify industries in national accounts and in the I-O tables. Hence, several other industrial and commodity classifications such as the ANZSIC, ANZSCC, ANZSPC and NA96CC were used to identify a good match to convert the HS classification into NAWI.

Using different commodity and industry classifications was the procedure chosen to convert exports and imports data of \$/tonne into the g_i ratio. However, a good match and small errors in the commodity to industry transformation is expected, because most commodities could be accommodated into one specific industry. Only less than 0.1% of the analysed commodities were difficult to perfectly match with one industry, but could be done relatively well. For instance, the commodity “Sculptures and statuary; original, in any material” was difficult to classify, and was considered as retail trade industry.

Nonetheless, to use import and export data as proxies for the products consumed internally to the country (domestic consumption) is a more concerning assumption than the industry and commodity classification match. This decision assumes that the prices of international and domestic products are similar and more importantly implies that the composition of the basket of commodities produced by each industry within the country is equivalent to the one of imported and exported products. In summary, the approach considers that export values are better proxies than imports of the domestically consumed goods, and for particular cases a combination of import values was adopted. For instance, it was assumed that imports are a better proxy for domestic consumption than exports for the fuel industry, fertiliser and other industrial chemical manufacturing and non-metallic mineral products. However, for the industries of wood, printing, machinery and furniture, it was assumed that a combination of imports and exports better explain domestic consumption.

The next step on the conversion of I-O data to transport data was to obtain a dollar per tonne ratio for individual industries. The commodity data set for New Zealand is available at the 'free on board' (FOB) dollar value for commodities, which represents the total monetary transaction for a given commodity. However, physical quantities of exported (and imported) commodities were not made available in a number of cases – 1,945 commodities. Hence, the estimation of the g_i parameter could not be readily made. In these cases either data for other years were used or an estimate of dollar/physical unit was obtained in available online databases (over 20 different online sources were used: industry associations, major national and international retailers, government data sets and various data sources). In some cases, the price for that specific commodity could not be obtained because it was not possible to find a perfect match, as the disaggregation of the data was too great. Therefore, similar commodities were used as substitute. Such cases represented only 0.5% of the total free on board dollar values, which did not consequently compromise the analysis.

For many commodities the quantity measurement unit was not the tonne or a measure of weight (kilograms or grams), as some commodities are not measured or sold by weight. For instance, animals and many manufactured products were measured non-dimensionally (sold per unit), floor coverings is sold in square metres, liquids in litres, wood in cubic meters, etc. Hence, an additional task was performed to transform all quantity units into the same unit of weight (tonnes). Similarly to previous activities, different reliable data sources were consulted.

A total of 3,821 commodities were measured in weight units and the others were transformed. This final step generated the value density parameter g_i, which represents the value in New Zealand Dollars per tonne (NZD/tonne).

Proposed g_i values for the year 2009 were assessed by comparing them to other published data to ensure accuracy and consistency. An initial investigation was made by evaluating the results against total gross weight (tonnes) of exports in NZ and the quantity in tonnes of 26 principal exports of the country (aggregating major HS classifications). Additionally, the estimated g_i was assessed against the NZD/tonne (g_i^*), which was obtained by a similar procedure executed by Infometrics in a report to Land Transport New Zealand (Jewell *et al.*, 2007) for different years (2001 and 2004) and similar industry disaggregation, as shown in Table 4.15.

Table 4.15: Value density g_i and g_i^* (NZD/tonnes).

Industry Grouping	**2009** g_i (NZD/ tonne)	**Jewell et al industry classification**	**2004** g_i^* (NZD/ tonne)	**2001** g_i^* (NZD/ tonne)
Horticulture and fruit growing	1,951	Horticulture	1,340	1,400
Livestock and crop farming	12,225	Pastoral agriculture	13,120	2,500
Dairy and cattle farming	3,153			
Other farming	143			
Forestry and logging	278	Forests	210	270
Fishing	5,040	Fishing	3,720	5,630
Coal mining	113	Mining	70	70
Other Mining and quarrying	101			
Oil extraction, production, refining and manufacturing	770	Petroleum	250	390
Meat manufacturing	4,887	Meat processing	4,630	5,020
Dairy manufacturing	5,136	Dairy processing	2,730	3,820
Other food manufacturing	2,278	Other food, beverages and tobacco	1,790	1,850
Beverage, malt and tobacco	4,509			
Textiles and apparel	6,840	Textiles	7,020	7,460
Wood product	1,511	Wood	2,230	2,740
Paper and paper product	791	Paper	670	1,090
Printing, publishing and recorded media	11,055			
Fertiliser and other industrial chemical	819	Chemicals	3,410	1,590
Rubber, plastic and other chemical products	4,393	Non-metallic products	1,470	1,980
Non-metallic mineral products	2,101			
Basic metal	2,308	Basic and fabricated metals	1,690	2,310
Structural, sheet and fabricated metal products	10,647			
Machinery and other equipment	26,736	Equipment and machinery	16,810	21,280
Furniture and other manuf.	22,084			
Construction	10,000			
Wholesale and retail trade	12,000			

As observed in Table 4.15, the value density g_i obtained and the ones published by Jewell *et al.* (2007) for the years 2001 and 2004, g_i^*, were consistent between each other and in accordance with the price rises observed in some industries, such as petroleum and dairy products. There is a linear relationship between commodity values and the generation of trips, as described in Equations 4.2 and 4.3. Hence, a 10% increase in commodity values would indicate a 10% decrease in trips generated throughout the network. Thus, this is a critical step in the conversion process.

Another data issue that may affect the reliability of the results is related to the ratio that converts commodity weight by mode of transport to commodity trips by vehicle type, w_i^c. The ratio w_i^c was calculated based on the RUC licences purchased by unique vehicles (i.e. maximum allowed weight). This procedure involved assumptions on the handling factor, which were made following the approach adopted in the Transit New Zealand Heavy Vehicle Limits Project (Bayley, 2000). In that study, Bayley assumed that fully laden vehicles are in the range from 80% to 100% of the carrying capacity, empty vehicles transport less than 20% of their load capacity and partially laden the remainder (i.e. between 20% to 80%). Table 4.16 shows the vehicle loading estimated by Bayley (2000), both VKT and NKT - Net (payload) Kilometres Tonne.

Table 4.16: Estimates of vehicle loading

Type of Loading	Percentage of VKT	Percentage of NTK
Empty	48.0	0
Part Laden	34.4	40.8
Fully Laden	16.1	53.4
Over-loaded	1.5	5.8

Although there was inconsistency amongst different documents (Bayley, 2000, MetroCount, 2007, NZTA, 2010a) describing the definitions of the three vehicle classes: MCV, HCV1 and HCV2, the NZTA (2010d) description was adopted. The information about how freight vehicles are combined (trucks and trailers sizes) in New Zealand is available from the Weight in Motion (WiM) data collection and study under the responsibility of the Transport Agency. Currently the NZTA manages four WiM sites around the country, collecting axle loading data for traffic monitoring nationally, as shown in Table 4.17.

Table 4.17: WiM site locations per region.

Region	State Highway SH	Route Station RS	Description
Auckland	1N	461	DRURY -Telemetry Site 48 - (WiM Site 1205)
Waikato	1N	625	TOKOROA - Telemetry Site 51 - (WiM Site 421)
Bay of Plenty	2	171	TE PUKE - Telemetry Site 49 - (WiM Site 24)
Canterbury	1S	284	WAIPARA - Telemetry Site 52 - (WiM Site 518)

Average traffic counts for vehicle type and configuration were obtained for the four sites for the year of 2009 (NZTA, 2010a). This data was functional to estimate an index to represent how the freight vehicle fleet in New Zealand is used. This index ultimately characterizes the transport activity in New Zealand, while the vehicle classes (MCV, HCV1 and HCV2) define the vehicle fleet. According to the vehicle fleet distribution of the Weight in Motion (WiM) report (NZTA, 2010a), MCV represented 84.7% of the trips made with RUC vehicles class 2, and HCV1 represented 25.8% of the trips made with RUC vehicles class 6 and 21.2% of RUC vehicles class 14; the rest of the trucks are used with trailers in several combinations, which together sum to the HCV2 vehicles. As guidance, Table 4.18 gives vehicle description, freight carried and gross weight for each vehicle class and RUC class.

Table 4.18: Vehicle fleet configuration.

Vehicle Class	Diagram	Description	RUC Vehicle Class	Combination Code	Weighted average weight carried (tonne)
MCV	o-o	Short truck / bus - w/b 2.0-4.0m	2	R11_L	2.97
	o--o	Short truck / bus - w/b > 4.0m	2	R11_H	5.32
HCV1	o---oo	3 axle truck / bus	6	R12	11.51
	oo---oo	4 axle truck	14	R22	12.09
HCV2	o-o---o	3 axle articulated vehicle	2 + 24	A111	10.29
	o---o-o---o	Truck and Trailer	2 + 27	R11T11	10.06
	o-o---oo	4 axle articulated truck	2 + 29	A112	12.99
	o---oo-o---o	Truck and Trailer	6 + 27	R12T11	21.08
	o-oo---oo	5 axle articulated truck	6 + 29	A122	17.72
	o---oo-o---o	Truck and Trailer	6 + 37	R12T12	23.02
	o-oo---ooo	6 axle articulated truck	6 + 33	A123	13.57
	oo---oo-o---o	4 axle truck, 2 axle truck	14 + 27	R22T11	5.94
	o-oo----oo--oo	7 axle B-train	6 + 2*29	B1222	24.14
	o---oo-oo---oo	Truck and Trailer	6 + 43	R12T22	24.60
	o-oo---oo-o---o	5 axle articulated truck, 2 axle articulated trailer	6 + 29 + 27	A122T11	27.45
	oo---oo-o---oo	Truck and Trailer	14 + 37	R22T12	23.91
	o-oo---ooo—oo	8 axle B-train	6 + 33 + 29	B1232	25.62
	oo---oo-oo---oo	Truck and Trailer	14 + 43	R22T22	24.42

The procedures to estimate the average carried load and the percentage of trips distributed to each of the vehicle classes can be a source of error in the estimation process. Moreover, regional distribution of trucks is very different among regions. The regional distribution of trucks and loading was ignored and a national average value was used. In a research conducted in New Zealand in the 1980s (King *et al.*, 1983), it was observed that types of trucks used in different regions are reasonably different. In a more recent study, the NZNFM has also reported that the average payload can vary among regions, caused by the types of commodities carried, the proportion of larger commercial vehicles, and the proportion of empty or part laden trips of each region (Bolland *et al.*, 2005). Thus, considering national averages can also be a source of error for this model.

Additional data treatments had to be conducted so the modelling efforts could take place. In general, such processes are time consuming, as data bases are generally not initially designed for transportation modelling. For instance, the geographic file of the road network had to be filtered and the network connectivity had to be fixed. It was observed that many links were not connected with consecutive links. Initial connectivity tests indicated around 5,523 points where links were not properly connected. As already mentioned, such poor connectivity is often a result of geographic bases not been developed for the specific purpose of transport modelling. Thus, a manual process of connecting consecutive links to each other needed to be performed. With that, the final network was comprised of 2,831 links and 2,601 nodes (i.e. two or more endpoints which are overlaid).

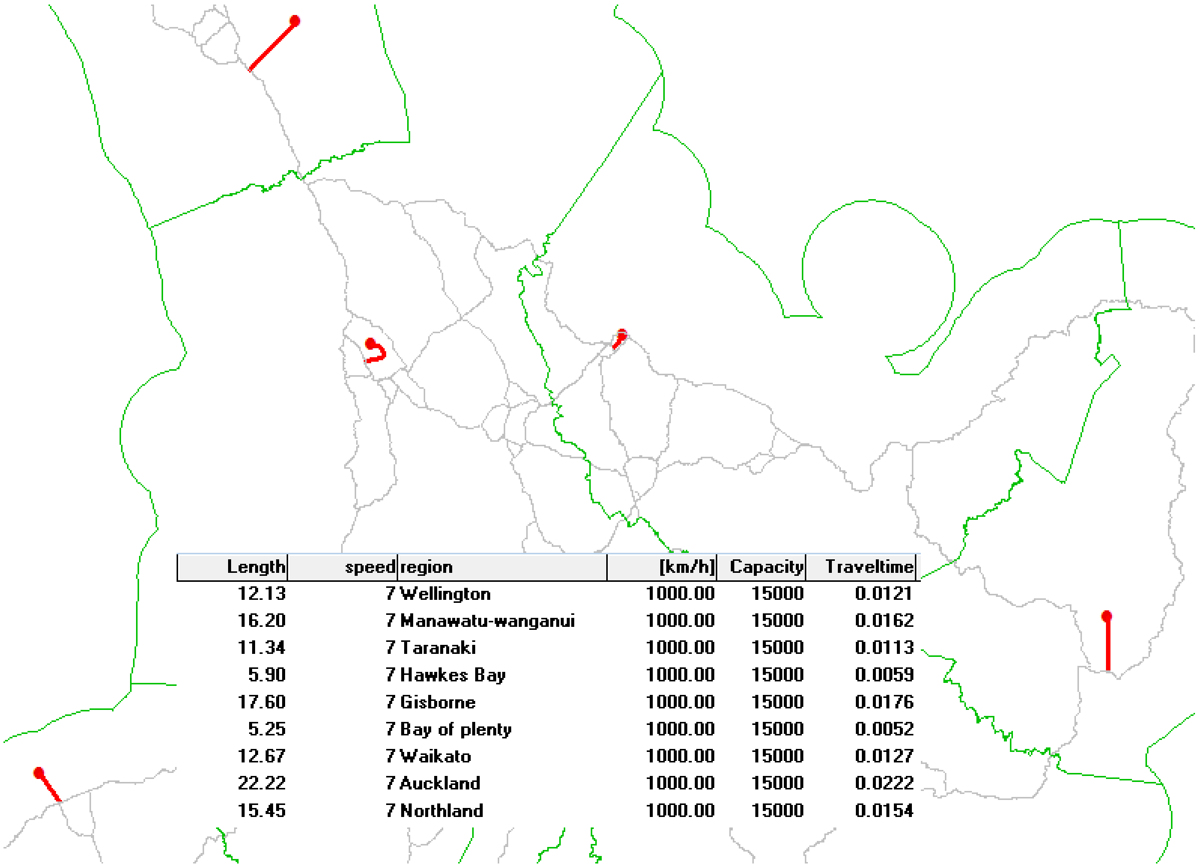
The next step in the treatment process was to assign traffic directions and number of lanes to the links. The most commonly observed state highway configuration in New Zealand is the two-lane single-carriage way. Other configurations normally observed in urban highways and major arterial roads were visually inspected using free satellite images and field knowledge, which allowed a sufficiently accurate update of the number of lanes for individual links. One way links had to have traffic direction defined in order to avoid future problems when assigning traffic during the modelling, for instance in roundabouts and U-turns. Traffic was assigned according to the left hand side driving pattern used in New Zealand. The final obtained network was compared against published data from the New Zealand Transport Agency (NZTA, 2010c) for lane length and length of network, as shown in Table 4.19. The maximum value of error was in the Auckland Region, 11.1% and the average national error was 2.6%.

Table 4.19: Network physical characteristics.

Region	length (lane km) / length (km)		Percentage error (*PE*)
	Observed	Estimated	
Northland	2.05	2.00	2.26%
Auckland	3.51	3.12	11.07%
Waikato	2.09	2.03	2.90%
Bay of Plenty	2.12	2.07	2.27%
Gisborne	2.00	2.00	0.11%
Hawkes Bay	2.06	2.00	3.14%
Taranaki	2.09	2.10	-0.40%
Manawatu/Wanganui	2.08	2.00	3.64%
Wellington	2.62	2.62	0.09%
North Island	**2.18**	**2.11**	**3.15%**
Nelson/Marlborough/Tasman	2.03	2.00	1.34%
Canterbury	2.06	2.00	2.68%
West Coast	2.00	2.00	-0.14%
Otago	2.05	2.00	2.63%
Southland	2.05	2.00	2.20%
South Island	**2.04**	**2.00**	**1.93%**
New Zealand total	**2.12**	**2.06**	**2.6%**

A final treatment measure performed was linking the defined zone centroids to the available road network. In this respect a long link was created with a very high number of lanes, speed and road capacity[30]. This virtual link represents the local roads and available road capacity used by freight transporters. Note that such approach has been taken as the proposed model for this thesis focuses on non-urban freight transport movements; therefore, only analysing how goods move between urban centres with no major consideration given to inner-city movements and logistics. Centroids representing the Auckland, Waikato, Bay of Plenty, Gisborne and Taranaki regions and their respective connections to the road network are illustrated in Figure 4.6. Also, on the figure is a snapshot showing the length, travel time, speed, and capacity of those centroid connectors.

[30] The values are high because the interference of connecting the centroids with the other road links had to be minimized, otherwise traffic would not flow to other links of the network.



Length	speed	region	[km/h]	Capacity	Traveltime
12.13	7	Wellington	1000.00	15000	0.0121
16.20	7	Manawatu-wanganui	1000.00	15000	0.0162
11.34	7	Taranaki	1000.00	15000	0.0113
5.90	7	Hawkes Bay	1000.00	15000	0.0059
17.60	7	Gisborne	1000.00	15000	0.0176
5.25	7	Bay of plenty	1000.00	15000	0.0052
12.67	7	Waikato	1000.00	15000	0.0127
22.22	7	Auckland	1000.00	15000	0.0222
15.45	7	Northland	1000.00	15000	0.0154

Figure 4.6: Zone centroids and connecting road links

4.3. Model Results and Analysis

Total movements are dominated by mining products (coal and other minerals), representing 20.2% of all commodities movements, followed by forestry and logging (16.8%) and in third, with 16.7%, is livestock and other farming, including dairy, cattle and cropping farming, fishing and other farming, as depicted in Figure 4.7. Note that these three groups of industries are primary industries, which together are responsible for more than half of the total freight moved in New Zealand, excluding other primary industries such as horticulture. Figure 4.8 shows the proportions of the total tonnes moved by each industry (RUC industry classification). Agriculture, forestry and fishing vehicles and mining and quarrying vehicles moved a little over 44.5 billion tonnes, which is about 56% of the total tonnage generated (79.5 million tonnes). Manufacturing industries are responsible for approximately 34% of the tonne moved in the country. Service industries of construction and trade moved about 8% of the total tonnage.

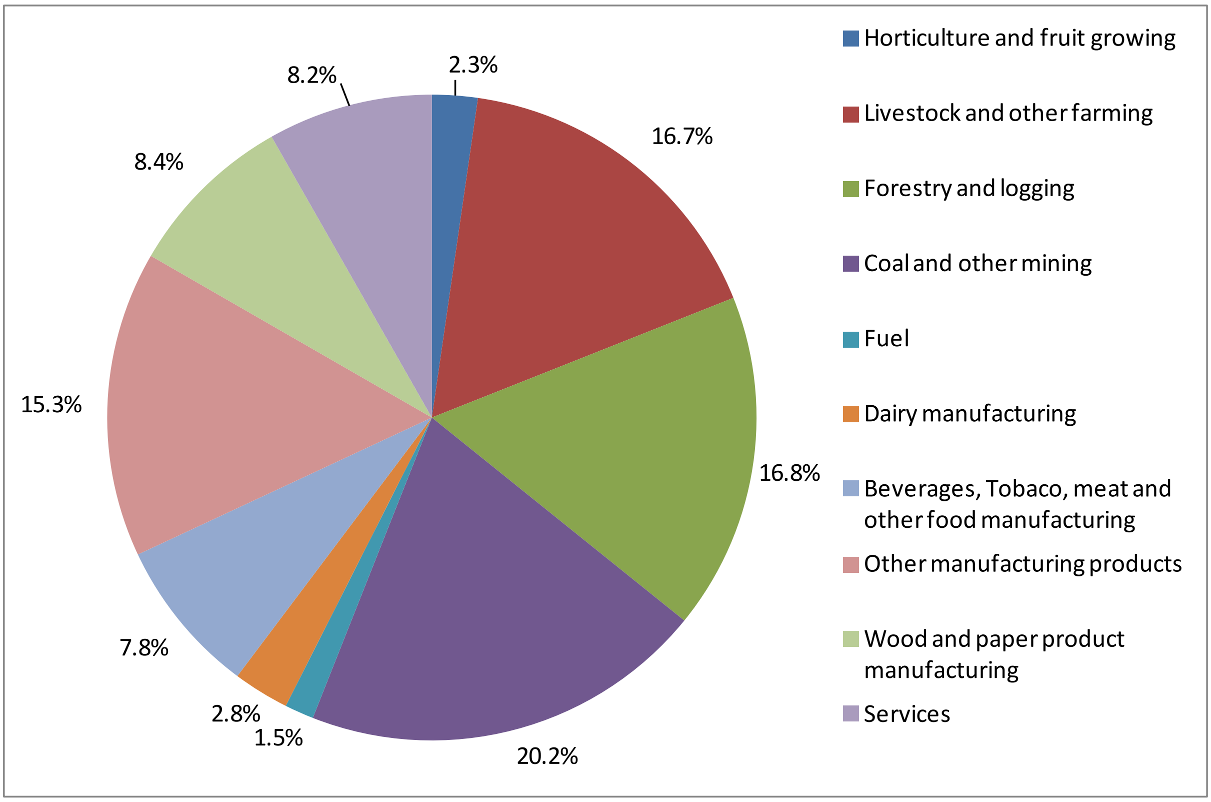


Figure 4.7: Percentage of tonnes moved by commodity

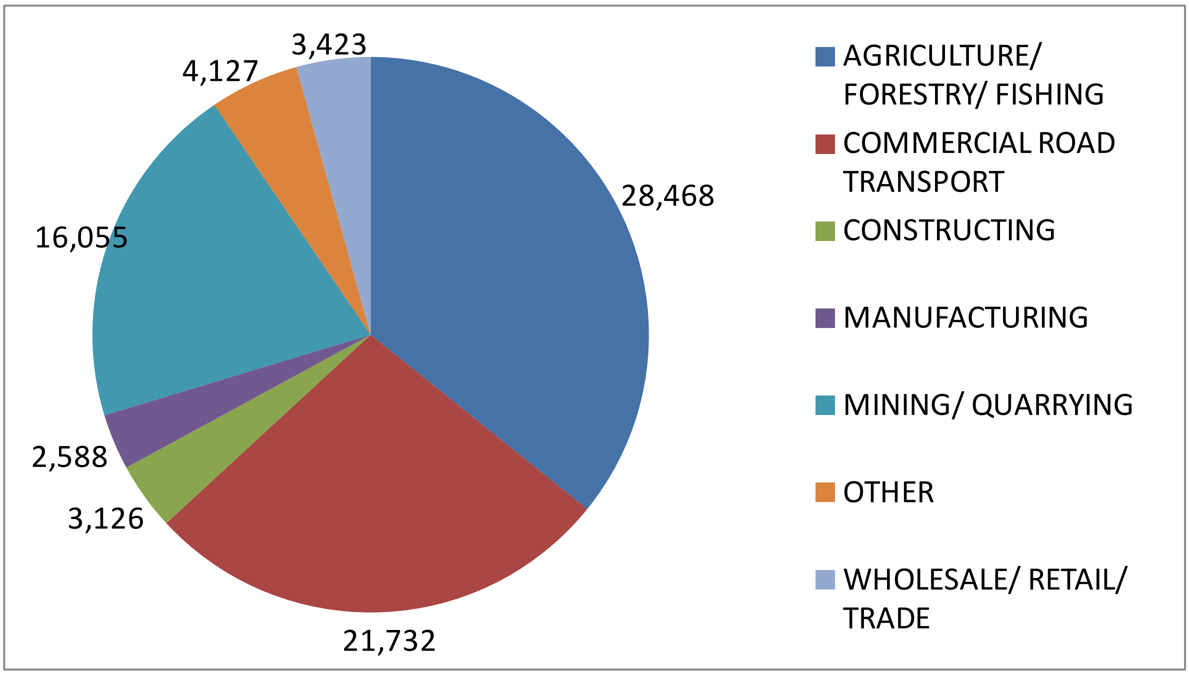


Figure 4.8: Tonnes moved by RUC industry

Furthermore, Figure 4.9 shows the distribution of freight trips by RUC industries. In total, it was estimated at 4,480,152 trips, being 37.1% of agriculture, forestry and fishing industry.

Commercial road transport vehicles accounted for 25.3% of the trips, and mining and quarrying vehicles 18.3%. Construction and trade vehicles corresponded to 10.7% of the trips, almost 3% more than the proportion of tonnes moved.

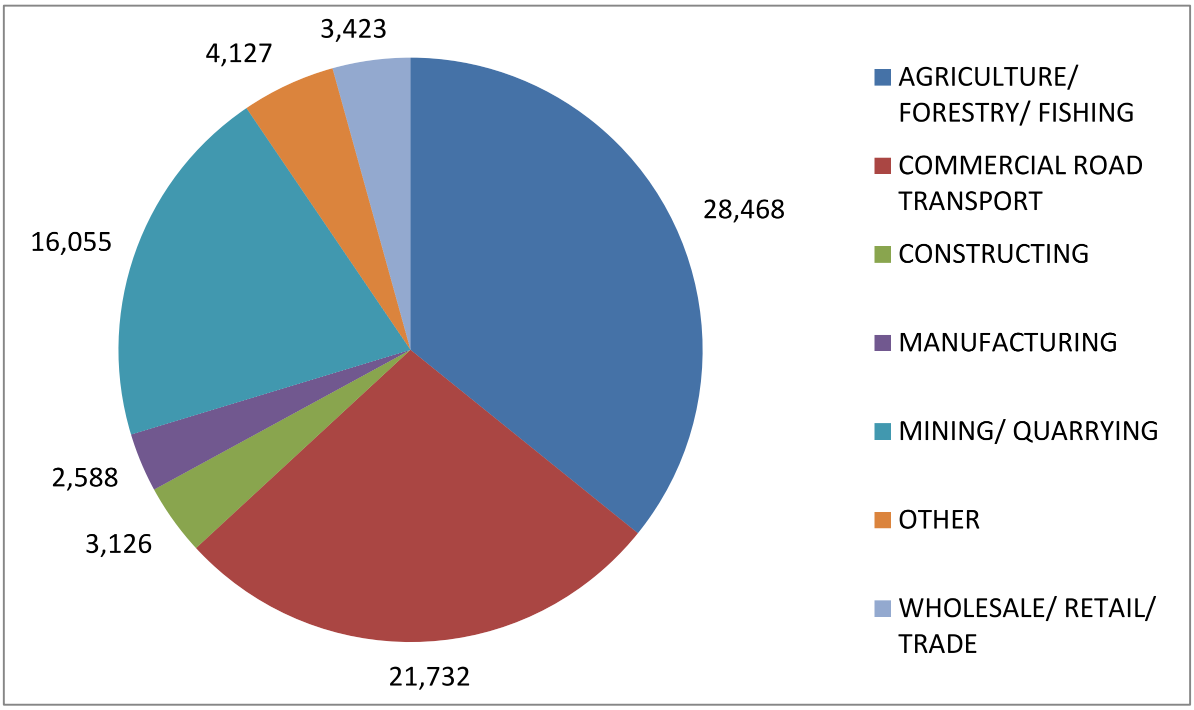


Figure 4.9: Trips produced by RUC industry groups

According to the model, New Zealand's road transport system moved in 2009 about 79.5 million tonnes of freight. Figure 4.10 shows the number of tonnes produced and attracted by region estimated in the proposed model. Before analysing the freight generation, it is worth remembering from Chapter 3 that the regions with higher gross output are (in decreasing order): Auckland, Wellington, Canterbury, Waikato, Bay of Plenty, Otago, Manawatu-Wanganui, Taranaki, Hawke's Bay, Northland, Southland, Marlborough, Nelson, Tasman, Gisborne and West Coast.

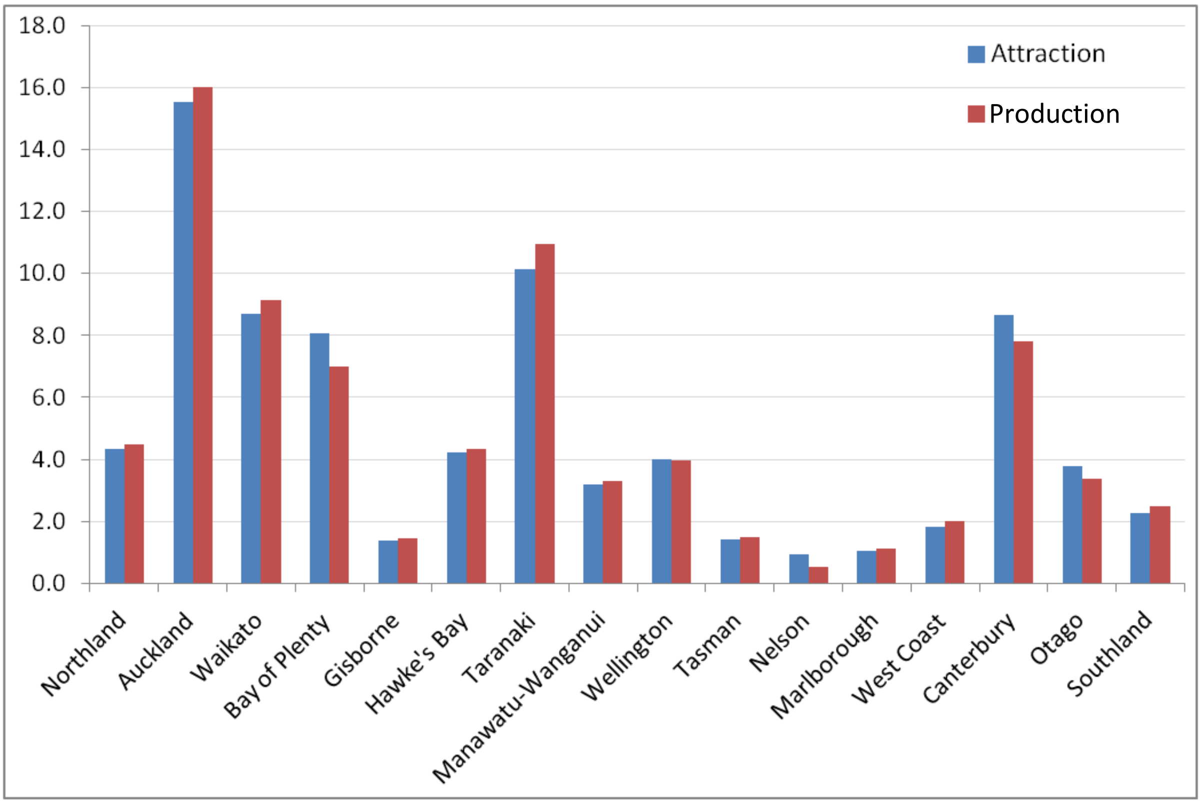


Figure 4.10: Tonnes produced and attracted by region

Auckland is the region that produced and attracted most freight, which was expected because it is the industrial, commercial and consumption centre of the country. The second and third biggest generators of freight are Taranaki and Waikato. Three industries together were responsible for 50% of the total freight produced in the country: other farming (see footnote 12 on page 72), mining, and forestry and logging. For this reason, Taranaki and Waikato are very representative of the freight transport activity in the country. Taranaki is the key region for mining and quarrying (48% of the country's total, or almost 6.5 million tonnes), with coal generating more than 1.4 million tonnes in Taranaki. So, it is the second biggest region for generating freight, but it is the eighth biggest region in terms of economic activity. Waikato, on the other hand generated about 1.9 million tonnes of freight for two industries (other farming, and forestry and logging) and also generated almost 1.2 million tonnes of mining and quarrying.

The fourth and fifth biggest freight generation regions are Canterbury and Bay of Plenty, respectively. In Canterbury it can be seen that the industries of other farming and mining generated approximately 2.2 and 1.4 million tonnes of freight, respectively. Canterbury produced nearly the same amount of freight as Waikato, but attracted less, which is explained by the fact that Waikato is a more agriculture-oriented region than Canterbury and does not have a port to provide it with the imports and export it produces. The Bay of Plenty is the region that produces the most forestry and logging products in the country, totalling 2.7 million tonnes, and is also a significant region for the production of paper products (about 1 million tonnes of freight), and other industries that generate less freight but when added are significant (other farming, wood, dairy, horticulture and fruit growing, etc.). Although Wellington is the second biggest region in terms of gross output, it is the eighth in terms of freight generation (attraction plus production) due to its high concentration of service industries and public administration.

This model estimated the total freight moved mainly by inter-regional and some intra-regional movements[31]. No doubt the total amount of tonnes moved is considerably increased when all freight movements are taken into consideration. The National Freight Demand Study - NFDS (Paling, 2009) estimated a total of 208.9 million tonnes moved by road in the year 2006-2007. Those values are greater than this model predicts. Another study, to develop a New Zealand National Freight Matrix (NZNFM) indicated a total of 89.63 million tonnes moved by road in the year 2002 (Bolland *et al.*, 2005). Using an increase rate of the total tonne-km moved given by the Ministry of Transport (MoT, 2011) to update the total estimated by the NZNFM (Bolland *et al.*, 2005), the prediction would be around 100 million tonnes of freight moved by road in 2009. That amount is approximately 20% higher than the amount estimated by this model (79.5 million tonnes). Thus, it can be assumed that the estimated volume of freight using the model developed in this research is reasonably accurate.

Nonetheless, the total tonne-km moved should not be as different. Intra-regional movements can be responsible for a considerable part of the total freight moved in a region, but because of the short distances travelled, tonne-km volumes should not be significantly affected. In this model it is estimated a total of 17.5 billion tonne-km. The NFDS (Paling, 2009) estimated a total of 18.8 billion tonne-km transported by road in the year 2006-2007. The Ministry of

[31] About 30% of the regions movements were intra-regional movements. If the input-output table were for micro-regions, than the total amount of freight would increase, as the micro-regions are more dependent on the other nearby regions. So, more movements would be made among the micro-regions.

Transport (MoT) produces statistics of the total freight tonne-km moved by road, estimated from the Road User Charges licences of 4+ tonnes. According to the MoT, 16.5 billion tonne-km of freight was transported by road in 2009, being 9.8 billion carried by trucks and 6.7 billion by trailers. So, the results show that the model produces estimates of freight tonne-km transported similar to the results of the NFDS and the MoT statistics. The estimates are lower than the NFDS's and higher than the MoT's.

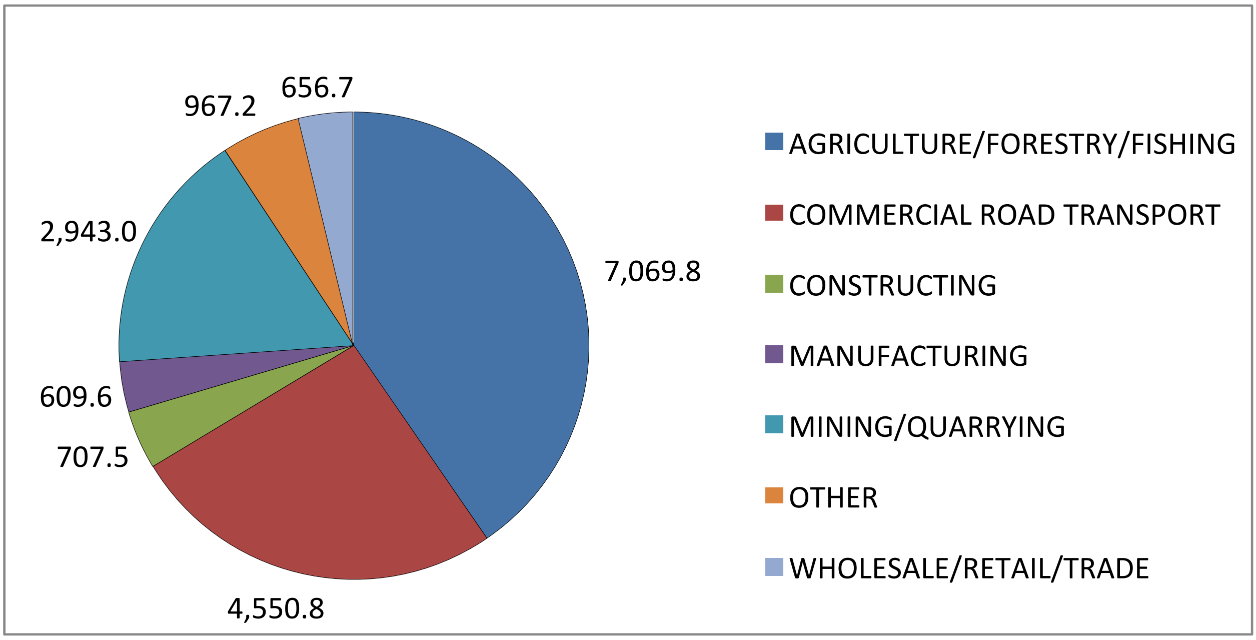


Figure 4.11: Summary of movements by RUC industry – Million tonne-kms

While tonne-km summary shows similar patterns to those for the tonnes lifted and trips generated, the share of mining and quarrying is smaller, being the industry responsible for 20.2% of the tonnes generated, 18.3% of the trips and 16.8% of the tonne-km moved. This reflects the short distances travelled by road for the low-value mining products and the higher share for HCV2 vehicles than most of the other industries (lower only than commercial road transport).

Gathering together the results for the individual commodities, the total movements are summarised in Table 4.20, which shows the tonne-km moved and total tonnage for each commodity group. The table also presents the distribution of the tonne-km per industry analysed in the model.

Table 4.20: The freight task for commodity groups.

Product	**Tonnes**	**Tonne-km (Millions)**	**% Tonne km**
Horticulture and fruit growing	1,809.8	449.4	2.6%
Livestock and cropping farming	606.4	150.6	0.9%
Dairy and cattle farming	2,630.1	653.2	3.7%
Other farming	9,890.2	2,456.2	14.0%
Forestry and logging	13,382.5	3,323.4	19.0%
Fishing	148.9	37.0	0.2%
Coal mining	2,427.1	444.9	2.5%
Other Mining and quarrying	13,627.9	2,498.1	14.3%
Oil production and Petroleum refining, product manufacturing	1,157.7	271.3	1.5%
Meat manufacturing	1,280.7	268.2	1.5%
Dairy manufacturing	2,224.4	523.9	3.0%
Other food manufacturing	3,754.4	786.2	4.5%
Beverage, malt and tobacco manufacturing	1,166.6	244.3	1.4%
Textiles and apparel manufacturing	301.7	63.2	0.4%
Wood product manufacturing	2,969.3	695.9	4.0%
Paper and paper product manufacturing	3,738.2	782.8	4.5%
Printing, publishing and recorded media	365.4	76.5	0.4%
Fertiliser and other industrial chemical manufacturing	6,339.4	1,327.5	7.6%
Rubber, plastic and other chemical product manufacturing	1,068.5	223.7	1.3%
Non-metallic mineral product manufacturing	1,540.3	322.5	1.8%
Basic metal manufacturing	1,575.7	330.0	1.9%
Structural, sheet and fabricated metal product manufacturing	534.2	111.9	0.6%
Machinery and other equipment manufacturing	364.0	85.7	0.5%
Furniture and other manufacturing	67.0	14.0	0.1%
Construction	3,126.1	707.5	4.0%
Wholesale and retail trade	3,422.6	656.7	3.8%
TOTAL	**79,518.8**	**17,504.7**	**100%**

The modelled percentage distribution of the tonne-km moved on the network can be compared with other studies that also calculated this distribution. NFDS and NZNFM results are shown in Table 4.21, as well as the proposed model results.

Table 4.21: Comparison of NFDS, NZNFM and this model's commodity breakdown by tonne-km - percent of total flows

Product / Industry	**NFDS**	**NFM**	**Lang's model**
Logs and wood products	14.4	16.1	23.0[1]
Manufactured dairy products	1.4	0.2	
Liquid milk	5.7	6.6	7.6[2]
Livestock and meat	2.1	6.5	
Horticultural products	4.1	In other	2.6
Aggregate	8.6	In other	
Other minerals	0.7	0.5	14.3[3]
Limestone	1.2	In other	
Petroleum products	8.3	2.6	1.5
Aluminium and steel	1.1	0.2	2.5[4]
Coal	4.7	1.9	2.5
Fertiliser	2.1	2.1	7.6[5]
Cement	2.6	1	1.8[6]
Concrete	0.3	In other	
Food products	3.6	In other	4.5
Other retail products	4.9	In other	3.8
Courier movements	0.8	In other	N.A.[7]
Other	33.4	62.3	28.3

Notes:

[1] Also includes other forestry products;

[2] Part of this group was considered in other farming, which is 14% of the total tonne-km, here included in 'Other';

[3] It includes other mining and quarrying;

[4] Industry groups: basic metal manufacturing and structural, sheet and fabricated metal product manufacturing;

[5] Fertiliser and other industrial chemical manufacturing industry group;

[6] Non-metallic mineral product manufacturing industry; and

[7] Courier movements were not considered in this model.

It can be observed, from Table 4.21, that this model industry breakdown by tonne-km is for most commodities consistent with the results of NFDS and NZNFM. The divergences can be explained mostly by the differences in description of the products/industries. Both NFDS and NZNFM refer to commodities categories, while the proposed model concerns industry groups, being a more comprehensive category, and includes several commodities. In this sense, it is expected that the proposed model would have higher percentages for each industry than the other two models, except for horticultural products, petroleum products and retailing, which are more substantial in intra-regional areas (this study focused on inter-regional freight flows).

In future, most industries are expected to have an increase in the total movement of goods. The increase reflects both a rise in volumes sold (increase in population and in purchasing power) and the effects of greater than ever centralisation of activities and industries, through the pressure of more economies of scale and more dense cities and regions, as well as more distribution centres, increasing efficiency, but at the same times raising the total number of movements. This tendency is also acknowledged by Paling (2009), whose conclusion is more focused on retailing movements. He states that, "*In terms of tonne-kms, the freight task is forecast to remain virtually unchanged, with increasing volumes of imported goods being delivered directly to Wellington and Canterbury, replacing the movement by land from Auckland. As a result, the average length of haul of goods carried for supermarkets and other food outlets is forecast to drop significantly*". For the NFDS, the outputs of basic commodities will increase, but they will be associated with short trip lengths.

Thus, taking into consideration the abovementioned forecast, the total tonne-km moved should decrease with time. However, according to the statistics provided by the MoT, the total tonne-km moved has continuously increased over the past ten years, with a 25.4% increase from 2001 to 2010. On the other hand, there was a considerable decrease in 2009, related to the world economic crisis. In 2010, the movement increased again (5.9%) to a level higher than the previous five years (annual average increase of 2.7%, from 2005 to 2010, excluding the year 2009).

Network flows are shown in Figure 4.12, where the AADT (average annual daily traffic) was calculated for each link, in number of trips, as described by Equation 4.8. The width and the colour of the lines indicate the amount of flow, where dark blue represents the links with greatest traffic and yellow the links with least traffic. The lines in gray represent the links to which the model did not allocate any traffic, because they are not on the route connecting regions. The links with greatest traffic are observed in the route between Northlands and Wellington and between Taranaki and Waikato. All the links with more than 800 trips a day were found to be in the North Island while most links with less than 50 trips a day were found in the South Island. Freight movements in New Zealand are mainly concentrated in the corridor of the State Highway 1 – SH1, from north (Whangarei) to south (Dunedin); the second corridor with more freight is SH3 – New Plymouth-Hamilton, followed by SH2-SH5: Palmerston North – Napier – Taupo and SH2: Auckland – Tauranga.

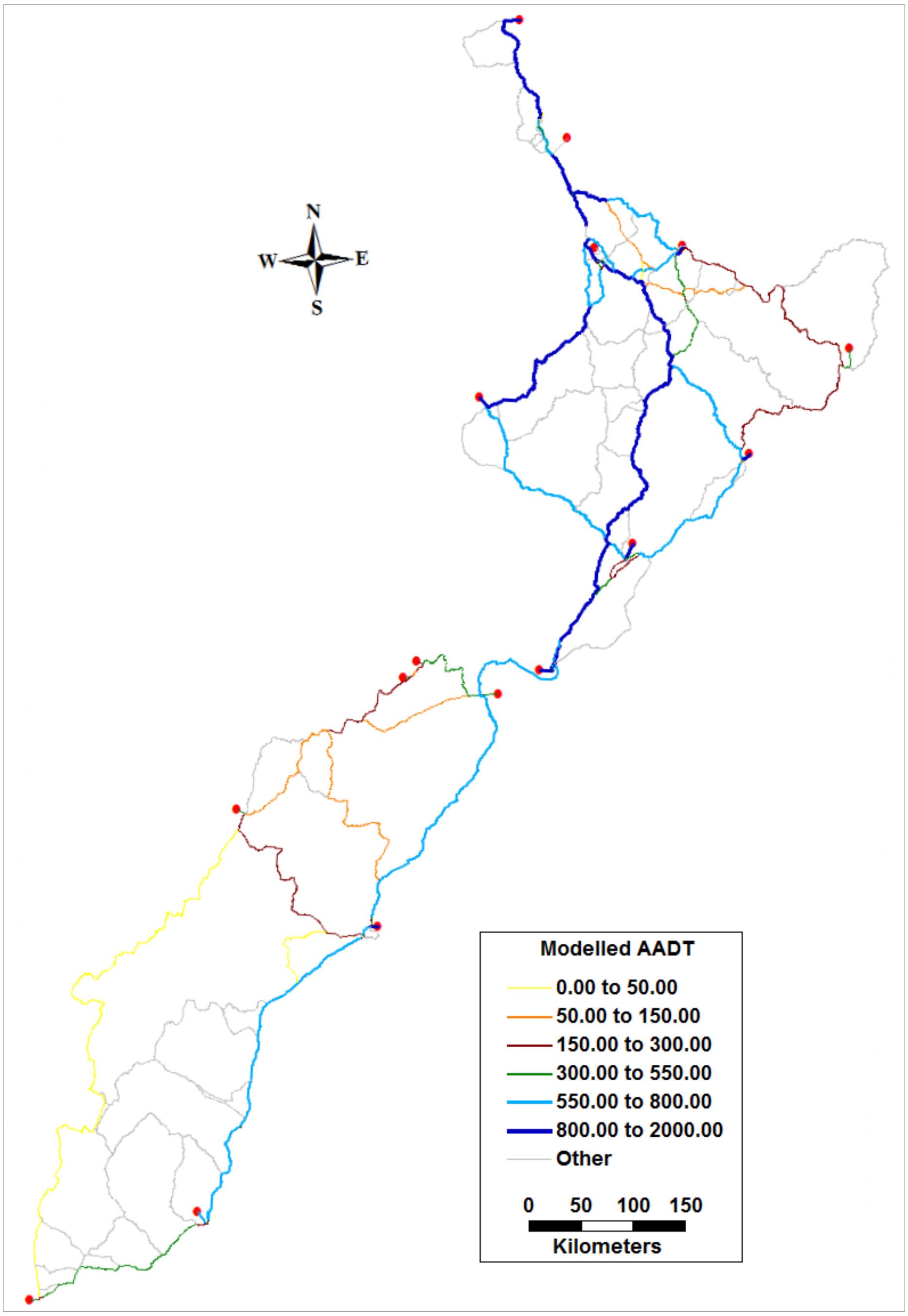


Figure 4.12: Network flows

$$AADT_a = \sum_c 24 \frac{q_a^c}{t_a^c} \tag{4.8}$$

where:

q_a^c = modelled hourly flow in link *a* by vehicle type *c*

t_a^c = travel time on link *a* by vehicle type *c* (generalized travel cost);

Observe that the Cook Strait ferry link is considered equivalent to a road link between North Island and South Island in this model. According to the NFDS (Paling, 2009), the combined volume of road freight carried in both directions between Wellington and Picton by the two ferry operators is between 2.0 to 2.5 million tonnes per annum, with more southbound traffic (2006 data). NFDS revealed a total of 3.1 to 3.7 million tonnes of total freight, being 30% to 40% to be of rail freight. In this model, results show a total of 4.7 million tonnes of road traffic across the Cook Strait, being 37% northbound and 63% southbound. These values are higher than the NFDS estimation, however, they correspond to different years. Still, it can be said that the model seems to overestimate the traffic between the two islands and probably underestimates the Cook Strait impedance. Nevertheless, other results achieved a good correspondence with observed transport volumes.

Total vehicle kilometre travelled (VKT) is calculated per year as shown in Equation 4.9. For this model, the total VKT for heavy vehicles is 1.1 billion kilometres travelled. According to the NZTA State Highway Traffic Data Booklet, heavy vehicles have produced a total of 1.8 billion of VKT on state highways. Thus, this model VKT result is nearly 40% lower than NZTA results. The Economic Evaluation Manual (NZTA, 2010b) states that modelled VKT should be within 5% of observed VKT. However more information on observed VKT was not available; only aggregated values of heavy vehicles VKT for each region were available Moreover, the model only takes into account movement of freight between regions, Thus, the error is expected to be much greater than the 5% recommended by the EEM1. Thus, if traffic on Cook Strait is reduced, than VKT would also be reduced, worsening the model results.

$$VKT = 365 \times \sum_a AADT_a . d_a \qquad (4.9)$$

There are 34 links in the State highway network where flow data is available that can be used to estimate freight flows across regional boundaries (points in the middle of the link that connect two regions, in which traffic going from one region to the other have necessarily to pass through those points). Also, other links can be used to compare with the flows estimated by the model. The model results were compared with 92 strategically selected traffic counting sites in the network, according to previously mentioned selection method. Within these 92 sites, most of the 34 points that represent regional borders were included.

Figure 4.13 shows the selected traffic counting sites used to validate the model. The figure also shows the location of the regional centroids, to facilitate the analysis of the origin and destination of traffic volumes. Initially more traffic counting sites were selected, but a few had to be excluded because they were in areas that had many production or processing places located within the road section[32]. Thus, from the total of 230 road sections, traffic volumes were analysed for 92, which are depicted in Figure 4.13. Observe that the links between Taranaki and Waikato, on State Highway 3, were not included in this analyses, although a continuous vehicle counting site is located there (Tongaporutu Bridge).

[32] A road section is here defined as a set of one or more links that has at least one endpoint that has more than two links emerging from it. A link is the smallest road segment of the network and has similar physical characteristics (geometric, pavement condition, density, alignment etc).

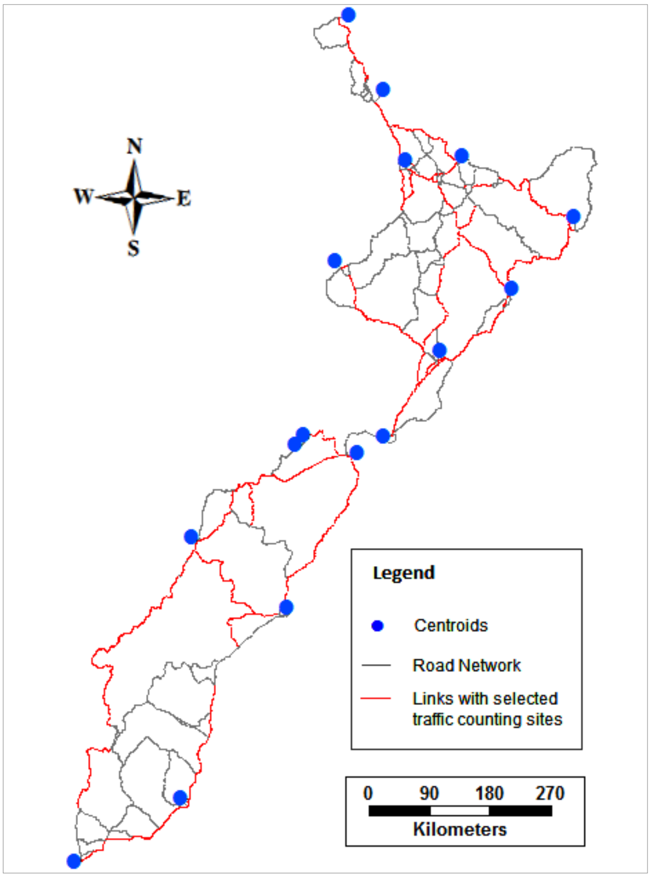


Figure 4.13: Traffic counting sites used to validate the model

Note that the physical count data, as recorded by NZTA, include many short distance movements which are not accounted for in this model. Therefore, it is expected that the VKT predicted with this model will be less than the actual VKT for most road links. In addition, traffic counts of heavy vehicles also include trucks and trailers carrying passengers, property movers and other movement of goods that are not of commodities, rather than point to point movements of commodities, for example, movements from a raw extraction site to a production site. These movements are outside the scope of this commodity model and analysis. Paling (2009) has indicated that the heavy vehicle traffic carrying other than commodities could be up to 15% of all heavy vehicle traffic.

The error between the modelled AADT and the observed (real) AADT were analysed. Here, the error was calculated in its simple form; i.e. the difference between observed and estimated flows, divided by the observed flow. The errors are expected to be positive (estimated flows lower than observed) for the reasons given above. It is observed that in most cases this is the case, as shown in Figure 4.14. Although, there are exceptions (blue colour links), this is not surprising given the inexact nature of the model and the assumptions about average loads and vehicle configurations. In particular, the assumption that the different regions have the same average load for each industry, which may vary significantly among them, could be an explanation for some estimation errors.

The main links where the observed flow is lower than the estimated are in the south of Northland, north of Wellington, west of Gisborne, south-east of Taranaki and over Arthur’s Pass. As stated before, total movements across Cook Strait are quite low. However, if adjustments are to be made to increase the movement across Cook Strait, this would generate an increase in the flow north of Canterbury in the direction of Picton and north of Wellington going to other North Island regions.

Regarding the routing of the flows, it is possible that alternative routes are taken by some of the heavy traffic, for reasons that are not explained by the proposed model’s variables and premises. The lines in gray (Other) represent the links the model did not allocate any traffic or were not within the 92 analysed road sections.

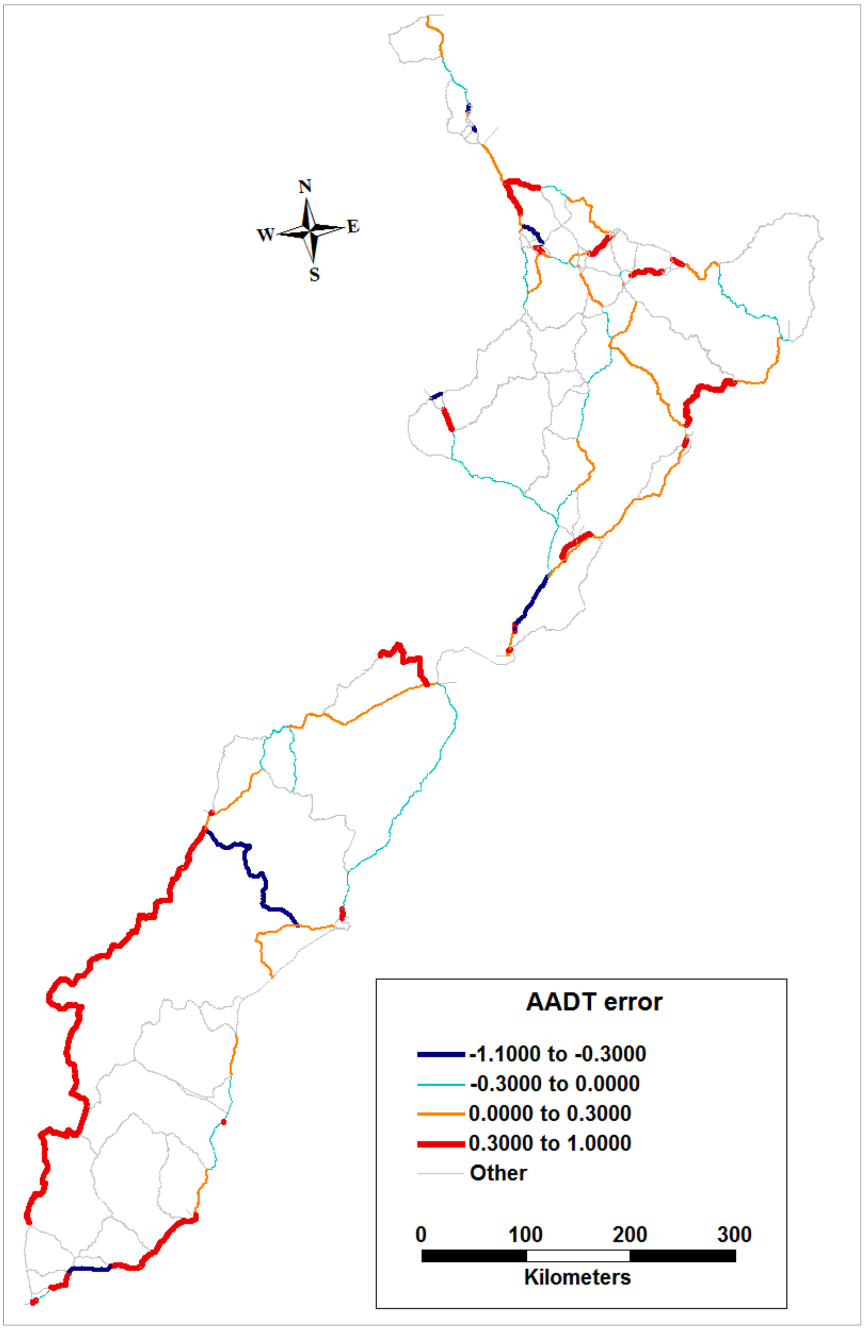


Figure 4.14: Percentage error between observed and estimated flows

The final outcomes were analysed for the three vehicle types (MCV, HCV1 and HCV2), as well as for the total flow, as Table 4.22 shows. The results were assessed using two main parameters, GEH statistic and RMSE. According to NZTA (2010b), more than 60% of individual link flows should have a GEH lower than 5.0, more than 95% of individual link flows should have a GEH lower than 10.0 and all individual link flows should have a GEH less than 12.0. The RMSE should also be less than 30%.

Table 4.22: Analysis of modelled flows using four parameters (Percentage %)

Results	**MCV**	**HCV1**	**HCV2**	**TOTAL**
GEH Statistics Less than 5.0.	100.0	100.0	98.9	76.1
GEH Statistics Greater than 5 and less than 10	0.0	0.0	1.1	20.7
GEH Statistics Greater than 10 and less than 12	0.0	0.0	0.0	3.3
RMSE	44.0	38.9	32.6	23.5
Average *PE*	31.8	27.0	33.1	17.3

From the results, it is observed that the GEH statistics are satisfactory for all parameters and all types of vehicles, as well as the total flow. The RMSE is on the limit for the total link flow and near the threshold for the HCV2 vehicles, but exceeds the threshold for the other vehicle types, i.e. MCV and HCV1. This shows good results for the model, because the total link flows are the target for the limits stipulated by the evaluation processes, which passed all criteria (RMSE and GEH).

Additionally, the NZTA (2010b) states that a reasonable percentage error (*PE*) tolerance for hourly volumes on most individual major links would be approximately 20% and for links carrying less traffic, the error tolerance may be greater than this. In this model, 63.0% of total link hourly volumes had *PE* of less than 20%, 79.3% had *PE* less than 30% and 94.6% of less than 40%. The total average *PE* is 17.3%, which is satisfactory.

One of the model's results is the road OD matrix. Each time we run the model, one OD matrix is obtained, however the results are in vehicle flows (pcu/h). This result had to be converted back to tonnage. Finally, all the obtained ODs are added to produce a final matrix. The results of the model's origin-destination patterns of the tonnes moved by road for all commodities are set out in Table 4.23.

Table 4.23: Final OD road matrix for all commodities (thousand tonnes in 2009).

Region		Destination																
		North-land	Auckland	Waikato	Bay of Plenty	Hawke's Bay	Gisborne	Taranaki	Manawatu Wanganui	Welling-ton	Tasman	Nelson	Marlbo-rough	West Coast	Canter-bury	Otago	South-land	TOTAL
Origin	Northland	928.7	1,539.6	626.3	509.1	168.0	62.3	376.5	93.6	99.4	12.0	8.4	11.0	6.7	35.0	7.4	2.4	4,486.3
	Auckland	1,527.6	6,375.1	2,561.8	2,082.6	687.1	254.6	1,544.8	382.2	408.2	47.2	34.3	44.6	27.4	144.0	31.0	11.7	16,164.0
	Waikato	626.5	2,581.3	1,919.8	1,402.6	491.3	173.7	1,136.4	274.0	291.9	34.3	24.0	31.9	19.7	102.6	22.3	8.7	9,140.9
	Bay of Plenty	413.4	1,703.1	1,134.9	1,639.0	446.4	199.3	753.9	248.8	265.2	30.7	21.7	29.0	18.0	93.3	19.9	7.4	7,024.0
	Hawke's Bay	159.9	655.8	465.9	522.7	808.7	184.2	527.9	369.5	374.3	43.3	31.4	40.7	25.4	131.6	28.0	11.0	4,380.2
	Gisborne	60.0	247.2	167.3	237.0	187.8	174.1	125.7	88.4	89.4	10.6	7.6	9.6	6.0	31.4	6.7	2.4	1,451.1
	Taranaki	388.1	1,605.4	1,171.4	956.0	563.5	131.7	3,826.5	680.6	725.0	83.9	60.2	79.2	49.5	256.6	54.5	21.4	10,653.5
	Manawatu-Wanganui	87.6	361.0	256.7	288.3	365.2	86.0	630.7	445.8	442.8	51.2	36.9	47.9	29.7	155.4	33.6	12.7	3,331.6
	Wellington	85.1	348.7	247.5	277.9	334.7	79.1	608.0	400.8	895.3	102.4	73.0	94.9	59.3	309.3	66.0	26.2	4,008.2
	Tasman	7.6	33.6	23.3	26.3	31.4	7.6	57.8	37.6	73.6	269.7	160.8	116.2	153.3	388.1	82.9	32.6	1,502.3
	Nelson	3.1	12.7	9.6	10.3	12.0	2.4	21.8	14.3	28.5	86.2	61.7	44.0	49.4	144.0	30.7	12.0	542.7
	Marlborough	7.4	31.2	22.3	24.7	29.7	6.7	54.2	35.9	69.3	116.9	84.0	110.2	69.1	355.3	75.9	29.7	1,122.5
	West Coast	4.3	18.7	13.0	14.4	18.0	4.3	32.5	21.1	40.3	147.3	87.7	64.5	460.1	775.8	184.5	82.8	1,969.4
	Canterbury	18.7	75.8	53.7	60.9	72.9	17.3	132.3	87.0	167.4	293.3	203.7	265.5	610.6	4,490.3	955.4	374.7	7,879.6
	Otago	3.6	14.6	10.3	12.0	14.6	3.6	26.7	17.3	33.1	58.2	40.3	52.0	138.3	886.0	1,487.6	580.4	3,378.7
	Southland	1.7	7.4	5.3	6.0	7.4	1.7	13.7	8.9	16.6	29.0	20.1	26.6	79.5	447.3	745.2	1,067.6	2,483.8
	Total	4,323.2	15,611.3	8,689.0	8,069.7	4,238.6	1,388.5	9,869.3	3,205.9	4,020.4	1,416.1	955.7	1,068.0	1,802.0	8,745.8	3,831.7	2,283.6	79,518.7

As results indicate, nearly 52% of all road movements are of less than 200 km and over 60% of all road movements are of less than 250 km. The greatest road tonnage corridors are the intra-regional movements of Auckland to Auckland, Canterbury to Canterbury and Taranaki to Taranaki, followed by Waikato to Auckland, Auckland to Waikato, Auckland to Bay of Plenty and Waikato to Waikato, in descending order. These seven corridors account for 30% of all road freight tonnage movements.

It is important to highlight that the results obtained from the model had no specific adjustments to the observed road movements. It could be argued that parts of it appear anomalous. However, while some long-distance freight movements may be overestimated and intra-regional movements underestimated, with the information currently available there is no reliable basis on which to adjust the numbers. In any case, further ad hoc adjustments could make the good aspects of the validation worse. A considerable effort would be required to obtain the data necessary to make adjustments to the matrix on a reasoned basis.

Some of the flow discrepancies could be reduced with the use of a more disaggregated industry breakdown of employment data. Errors in the economic model may have significant implications for total regional movements as well as for individual freight movements. Additionally, more information on vehicle loading, vehicle disaggregation and value density of commodities could improve the model performance.

The overall assessment described above suggests that, while there are inevitably some areas where movements were not well described, for most flows the results were reasonably accurate. The results obtained therefore give a good insight into current freight transport movements among regions. It is also a good base to forecast future freight transport movements and the trends on transportation systems under fuel constraints, which could be used for the development of proposals and policies for the freight sector.

5. Fuel Constraint Analysis

Fuel constraints can happen for several reasons (e.g. strikes, natural disasters and trade barriers) and mostly originate in the supply side of the market and are exogenous to the energy system. Fuel shortages impact not only the fuel sector, but the entire economy and may disturb people's wellbeing.

The exact impact of oil shortages on the economy and its macroeconomic indicators, especially GDP, is still unclear. Hirsch (2008) shows the relationship between world oil production and world economic development and stated that a reduction in fuel production of 5% would cause a reduction in GDP of 5%[33]. However, when using more recent and longer term data (EIA, 2008, IMF, 2009), it is observed that this 1:1 relationship between percent decline in world oil supply and percent decline in world GDP is overestimated.

Figure 5.1 depicts that the correlation was near to 1:1 only for some years (1988 to 1997) a taking average values. Also, it is assumed that the relationship between fuel consumption and GDP is not perfectly linear, as also stated by other authors (Asafu-Adjaye, 2000, Mallick, 2007, Zachariadis, 2007). Thus, the impact on GDP of a fuel constraint cannot be determined by taking only the fuel reduction value.

[33] It could be possible that the decreace in GDP and the decrease in fuel production are both caused by something else, without there being a direct causal relationhip between them.

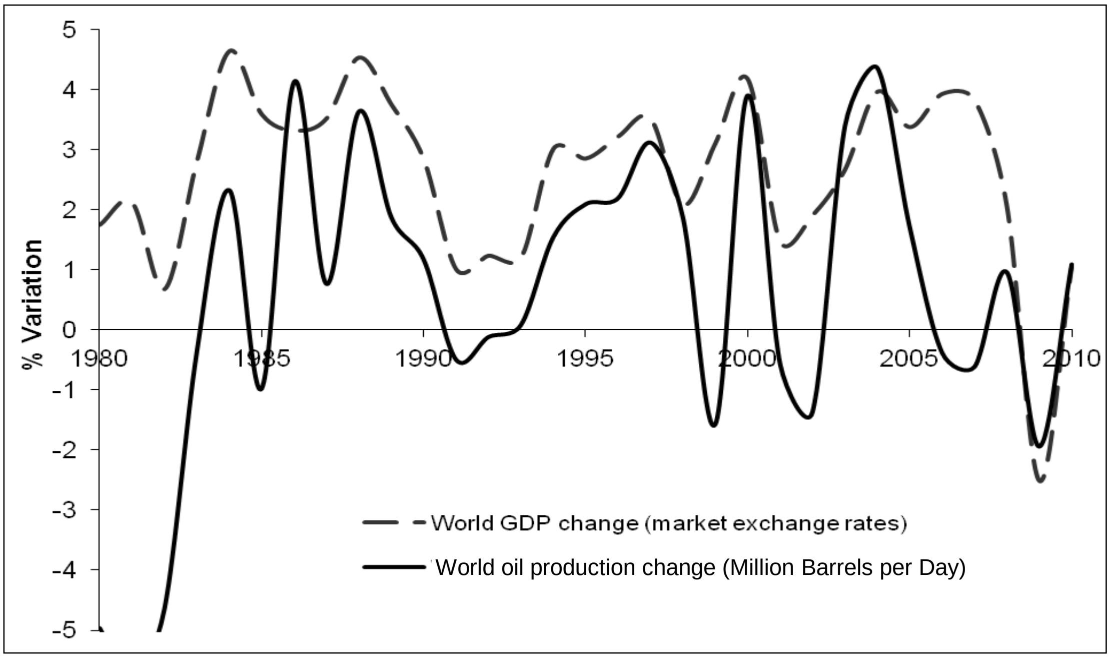


Figure 5.1: Relationship between world GDP and world oil production

Therefore, a model to determine the economic impacts of fuel constraints is introduced. The model is based on the mixed Input-Output modelling technique, as an alternative to analyse the impacts of supply constraints on the economy, better than a linear analysis and other I-O models. This is used to evaluate the impacts of scenarios of fuel constraints for different sectors. Consequently it is also able to establish a relationship between fuel decline and economic impact. The method is evaluated for the case of New Zealand.

The economic impacts affect the freight transport services demand and supply. Hence, impacts on the physical distribution of goods could be calculated by employing the freight transport model detailed in chapter 4. Finally other impacts of peak oil are also investigated.

In this context, the chapter has been divided into five sections. Firstly, the chosen method to assess peak oil is briefly described. The method to analyse the impacts of reduced fuel availability is applied in the second section, which is divided into five steps. Section 5.3 calculates the impacts of an increase in fuel prices. Section 5.4 analyses the impacts of peak oil on freight transport. Section 5.5 examines other impacts of peak oil noted in other peak oil studies. In the last section the results are discussed and preliminary conclusions are presented.

5.1. Fuel Constraint Analysis Approach

The fuel constraint studied in this thesis is Peak Oil. When Peak Oil happens, there will be no excess capacity on the economy[34], either a perfect substitute to fuel in the short or medium term. Available renewable energy sources, such as solar, wind and biofuels, probably will not produce enough energy to substitute economically and environmentally for traditional fossil fuels (Huesemann, 2003, BTRE, 2005), because some have an energy return on investment (EROI) of less than one. Lately, long term prospects indicate that nuclear energy (fusion[35]) could be an alternative for energy supply, or at least to climate change (Dresselhaus and Thomas, 2001). Nevertheless, this may not be possible in some countries, like New Zealand, that have banned nuclear energy, especially after the risks associated with this kind of energy in earthquake prone countries (especially after the 2011 Japanese Earthquake). Also, the solution is seen with scepticism by many others (Dittmar, 2012).

Furthermore, after Peak Oil, the reduced fuel supply will not be instantly adjusted within the economic system. Initially existing stocks of fuel would be consumed and then supply of fuel might be rationed. Priority uses could be imposed, such as medical services, and some industries could suffer with a greater rationing than others. This would affect the production of goods and services of the other sectors of the economy. The reduced production of goods and services will subsequently impact on the whole economic system.

Thus, the impact model has to incorporate supply constraints on certain production activities (Hubacek and Sun, 2001b). An input-output model is a well established technique to accomplish an economic impact analysis. I-O models can also be used to calculate the effects of resource constraints in the economy. However, the traditional and other I-O models have

[34] No excess capacity means that the current production is equal the producer's potential capacity, i.e. it is not possible to increase production.

[35] Nuclear fusion is a process under development to fuse together two or more smaller atoms, creating a larger, heavier atom. Few radioactive particles are produced by the fusion reaction itself, unless a fission trigger is used. Fusion requires very high energy to bring the protons close enough, but the energy released by fusion is three to four times greater than the energy released by fission, the current method to produce nuclear energy. The fuel used in fusion reaction experiments is hydrogen isotope, which is a renewable and clean source.

assumptions that are not consistent with supply constraint analysis. These assumptions are even more incompatible when studying essential resources constraints, such as fuel. For instance, the Leontief Model assumes that production will adapt instantly to changes in demand and that there is an excess capacity throughout the economy.

To account for restrictions in supply, Miller & Blair (1985) presented a mixed I-O model. This model assumes that supply is inelastic for some sectors, and is regarded as the best model to evaluate economic impacts in cases of constraints. It is also called the supply constrained I-O model. As previously demonstrated on the extensive literature review, the supply constrained I-O model considers the sector that is causing the disruption as exogenous to the system. After estimating the reduction on the constrained sector, it calculates the impacts on the other (or unconstrained) sectors.

When a constraint in fuel supply happens, it will affect the production of other goods and services and, in turn, these sectors will reduce their final output to adapt to restricted fuel supply. Consequently, the unconstrained sectors will interact with each other and with the fuel sector, in the exchanging of goods and services. These trades finally influence the final demand for fuel.

The fuel sector purchases labour from the household sector and pays for it as wages and other payroll outlays. The household sector also buys fuel directly from the fuel sector to use as final consumption, for instance to heat houses or fuel cars. Fuel taxes and fees paid to public authorities are payments to the government. The government also buys fuel for final consumption. Inputs (final payments) from the capital sector are represented by depreciation and stocks reductions. Finally, the inputs from outside the economy are imports and the outputs are exports.

An application of the mixed I-O can be explained using a flowchart of five steps, as shown in Figure 5.2. The first step is to determine the constrained sector, the second is to stipulate the constraint and the third is to apply the model. The economic impacts are calculated in step four and the other impacts of the constraint that were not incorporated in the model are analysed in the fifth step. The first and second steps are further explained in subsections 5.1.1

and 5.1.2. The third and fourth steps are detailed on section 5.2. Sections 5.4 and 5.5 describe the analysis of other constraint impacts.

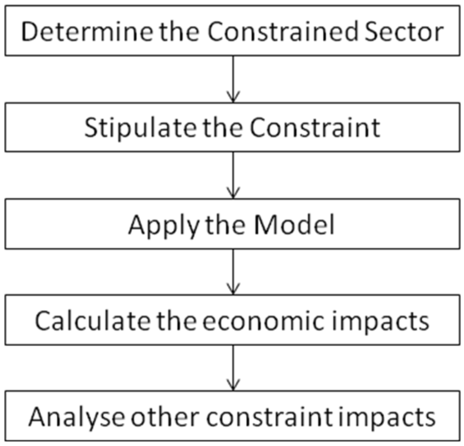


Figure 5.2: Steps to perform a mixed I-O analysis

5.1.1. Determine the Constrained Sector

The mixed I-O model estimates the impacts of a given reduction of output of the constrained sectors on unconstrained sectors. Thus, an important step is to determine the constrained sectors. Considering the study of peak oil, the constrained sector is the fuel sector. The fuel sector includes oil extraction, exploration, refining, distribution and petroleum product manufacturing. Sometimes the transaction table treats each of these elements (extraction, exploring, refining, etc) as a specific sector of the table. If this happens, they need to be combined as only one sector. The characterization of the fuel sector depends on the level of data aggregation and on data availability.

Even though it seems evident to say that peak oil means a constraint in the fuel sector, this is not necessarily true. A key assumption of the model is that the reduction of supply in the constrained sector is evenly distributed to all purchases from that sector by other sectors. Say, for example, that there is a 15% fuel constraint. Thus, the fuel sector will sell 15% less to all other sectors. However, if the distribution of fuel is broken down differently, not all sectors will be impacted at the same level. It can be argued that the fuel availability to some sectors will have to remain more or less constant. For instance, hospitals, health centres and government services could be highly prioritized, if the government policy chooses, i.e. they will not necessarily have an imposed fuel constraint, or the degree of constraint might be less than for other activities.

On the other hand, higher reductions could be imposed on industrial and transport sectors. This is because they are the most fuel intensive sectors and economic growth does not rely so much upon traditional industrial sectors (Li, 2008). For instance, together these two sectors represent about 95% of total liquid fuels consumption (petroleum) in the USA and 49% of total energy consumption, as shown in the Annual Energy Review (EIA, 2012b) and Annual Energy Outlook (EIA, 2012a). In New Zealand these two sectors represent 89% of liquids fuels consumption (transport alone is 81%) and 73% of total energy (Ministry of Business, 2014).

Past mixed I-O model applications have done analyses that do not consider direct restriction on the constrained sector. For instance, Davis and Salkin (1984) investigated a water curtailment only for the agricultural sector, so the constraint was not on the water supply sector, but on the agricultural sector. Analogous analysis could be made by limiting the fuel supply restriction only to the transportation and industrial sectors. Thus, the 'constrained sector' would be these two sectors and not the fuel sector as initially suggested.

However, most world economies are free capitalist markets with minimal levels of government interventions. The oil economy is also a free and globalized market. Oil companies operate according to these rules, pursuing the most profitable operations for the benefit of their stakeholders. Thus, price equilibrates supply and demand. Nevertheless, it is expected that, in the case of sustained fuel shortages, the economies will become more state regulated and some social protection may be put in practice. Yet, it is still reasonable to consider that the fuel sector is the constrained sector for the peak oil analysis, especially if one is interested in evaluating the medium term impacts of peak oil on the economy, rather than predicting long term policies trends. Therefore, for the analysis proposed here, we will adopt a simplified scenario. This means that peak oil is directly affecting only the fuel sector and indirectly influencing the other sectors.

5.1.2. Stipulate the Constraint

The next step to apply the mixed I-O is to specify the reduction of output of the constrained sector. It is important to remember that output as treated in the I-O models is a monetary value. It combines the quantity and the price of each and every product traded in the economy. Thus, the output constraint is also a combination of physical constraint and monetary constraint. Hence, to simplify, they will be treated separately in this section.

5.1.2.1. Physical constraint

The physical limitation refers to the exact constraint on fuel caused by peak oil. In the literature review several documents that studied this matter were presented. The conclusion is that there was no consent among the authors on the percentage decline in fuel supply, after the event.

Past oil crises, such as the Iranian revolution, the Persian Gulf War and the Suez Crisis, resulted in a reduction of world oil output of between 7.2% and 10.1% (Hamilton, 2003). These examples show the constraints posed by oil shocks or short term shortages in the world oil production. In those cases some countries, for political or economical reasons, had the interruption in oil production extended for months. In this study of peak oil, the focus it not dealing with short term oil shocks. Instead there would be a sustained disruption in the world oil production.

Considering that the oil production of a field generally has a bell shape, the decline rate is related to the growth rate. World oil production has had for the past 20 years an average increase of 1.6% per annum (Krumdieck *et al.*, 2009). Thus, it is assumed in this research that the constraint caused by peak oil will be approximately 2% per annum. Taking into consideration pessimistic and optimistic forecasts it can be said that this is not the worst case scenario (an 8% per annum decline), but a more realistic approach.

5.1.2.2. Monetary constraint

The monetary constraint is here defined as the total reduction of financial flow imposed to the economy by peak oil. Because of the monetary characteristic of I-O models, they are normally employed to analyse quantity variations and price constraints cannot be evaluated. This problem with the price is no doubt one of the limitations of the technique. To solve this issue, a combination of priced input-output models and quantity models, or a combination of I-O models with other techniques, may be applied. As a consequence, firstly it is important to determine the relationship between fuel price and fuel use.

The fuel use does not change significantly with variations of price (Gately *et al.*, 2002, Cooper and Campus, 2003, Bernstein and Griffin, 2006). Also, fuel supply is relatively inelastic in respect to price[36] (Dahl and Duggan, 1998, Greene and Ahmad, 2005). Yet, most studies on the relationship between fuel price and fuel use are made in reference to transport. This is because transport is the greatest fuel consumer. Again, the fuel price elasticity of transport demand is moderately inelastic, both for passenger and for freight transport (Small and Van Dender, 2007, Gargett and Hossain, 2008). Although, not conclusive Graham and Glaister (2002a, 2002b) identified that the price elasticity of fuel demand has a mean value of -0.48, and is probably between -0.1 and -1.0; and car-kms travelled elasticities with respect to fuel price is around -0.15 for the short run, with 87 percent of values falling between -0.24 and -0.01, and the long run elasticity has a wide range of values, from -1.02 to -0.07, with a mean value of -0.31. Thus, car travel is less elastic to fuel price than freight traffic. In New Zealand, the commercial travel demand elasticity with respect to fuel price was found to be -0.06 (Donovan *et al.*, 2008)[37], meaning that it is significantly inelastic, unlike what was found by Graham and Glaister and other authors.

The exact relationship between fuel price and fuel use is uncertain. Even considering one of the above-cited values as the exact price elasticity, the future price of fuel would still be unknown. Oil prices have oscillated widely over the last few years. Most of the price fluctuation was in response to short term factors such as wars, crises, natural disasters and speculations (Williams, 2008). Of these causes, probably the most relevant are the geopolitical tensions and uncertainties in the OPEC's countries (Brook *et al.*, 2004). These kinds of factors are hard to predict. Six attempts to forecast future fuel prices are depicted in Figure 5.3.

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[36] A review of 1083 fuel demand-related elasticity estimates indicated that the price elasticity of fuel demand is, on average, -0.25 for the short run and -0.77 for the long run (Graham and Glaister, 2002b), thus inelastic in both cases and more inelastic in the short run. A similar review of 46 estimates for short term and 51 for long term achieved similar results (Hanly *et al.*, 2002) for the fuel demand with respect to fuel price of -0.25 for the short term and -0.64 for the long term.

[37] Elasticities were selected from a combination of local and international studies, and using a limited sample size – only seven data points. More information on confidence, R-squared, etc. is not detailed in the study. Thus, this study could be less reliable than the others.

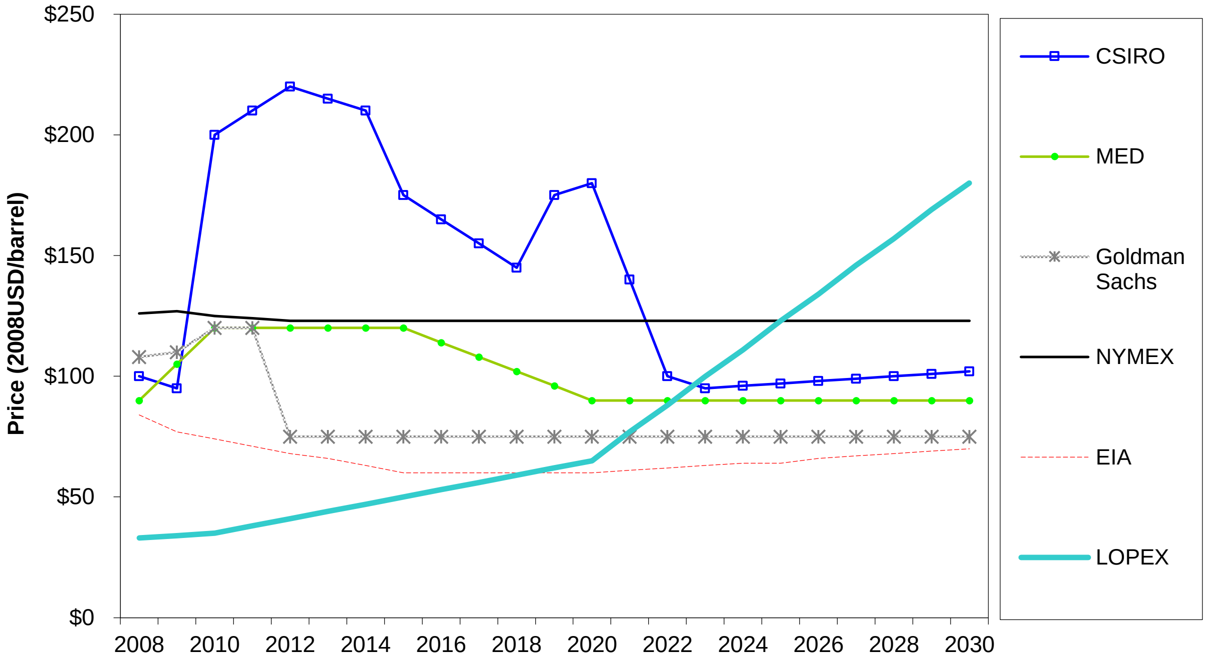

Figure 5.3: Forecasts of oil prices 2008-2030

Source: Donovan *et al*. (2008)

Donovan *et al*. (2008) analysed six models of fuel price forecasts shown in Figure 5.3. Based on these models and combining the information of each individual model, the authors created a ‘Meta Model’[38], shown in Figure 5.4. The Meta Model predicts annual average prices. In addition to the average values of the Meta Model, Figure 5.4 includes the 75th percentile confidence intervals.

[38] Meta refers to the fact that it generates future price projections on the basis of a number of individual forecasts. The model is based on a Monte Carlo simulation that moulds individual forecasts into a statistically representative distribution of prices over time. The forecasts of NYMEX, Goldman Sachs, MED, and EIA were called optimistic price forecasts and CSIRO and LOPEX price forecasts were called conservative.

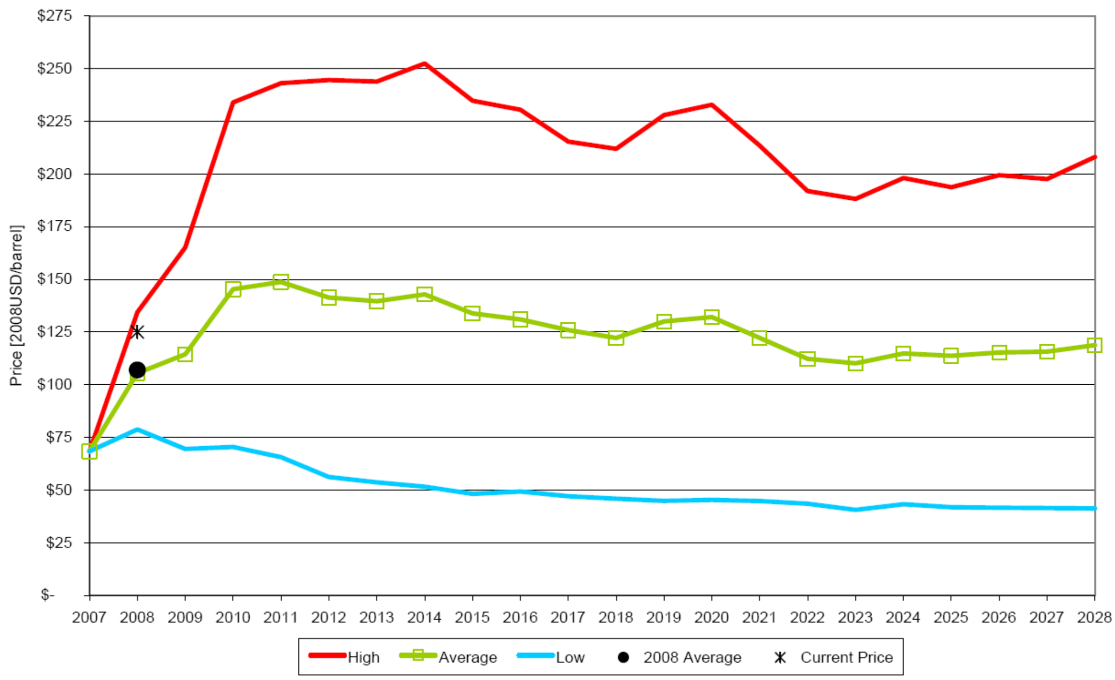

Figure 5.4: Oil price scenarios generated by the Meta Model 2007-28

Source: Donovan *et al*. (2008)

According to the model, prices would have a rapid increase until 2010, followed by a plateau and then gradual reductions. According to the authors, the short term prices were expected to be between the Average and High price projections (Donovan *et al.*, 2008). The average value for the years 2009 to 2014 was foreseen to be around USD 113.6, USD 140.5, USD 150, USD 140.9, USD 138.6 and USD 143.2, respectively. Even though their model does not include spot prices, the real average fuel prices of these years are, respectively, around USD 60.5, USD 79.4, USD 95, USD 94.5, USD 98.3 and USD 95.4, as at 04 of December 2014, as shown in Figure 5.5[39]. These values are distant than the estimated by projections of the Meta Model, between 50% and 70% lower. This illustration is not intended to degrade the Meta Model, but to show the difficulties in predicting future oil prices, given political moves that influence supply and demand relationships.

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[39] Oil price used was the New York Mercantile Exchange Light Sweet Crude Oil, NYMEX LS Crude, unadjusted, given by the GoTech website, available at http://gotech.nmt.edu/gotech

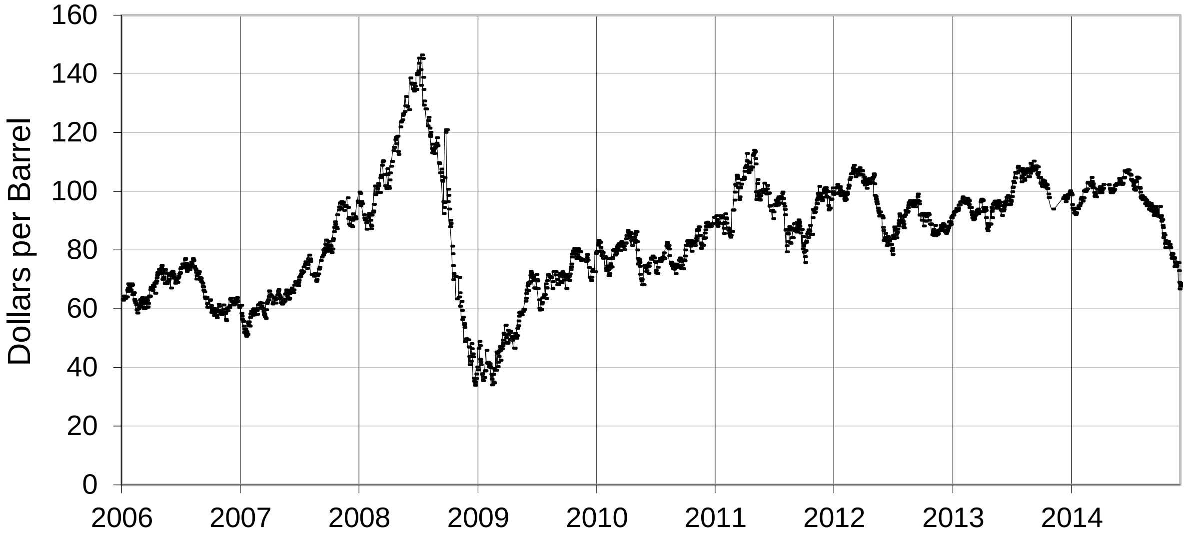

Figure 5.5: Oil prices between January 2006 and December 2014

The analysis of fuel prices can be rather complex due to the social issues it may cause. If a fuel shortage happens and the price is determined by normal supply-demand equilibrium, oil prices might go exceptionally high, because of very low supply and demand elasticities[40]. Sky rocketing fuel prices will probably affect the ability of the poorest part of society to consume fuel, even if they really need it. This may cause the government to control the oil prices or regulate the fuel consumption. Another possibility is to adopt a 'fuel concession' for low income users, such as it is observed for electricity in some countries. If this kind of intervention happens, fuel prices will be then exogenously controlled and be brought back to more affordable levels.

Nevertheless, it is important to emphasize that price fluctuations are rather important. Firstly, supply constraints are normally followed by price increases. Thus, considering a fuel constraint and ignoring price variation is probably not a very realistic scenario. Secondly, some economists believe that because markets are open, supply and demand equilibrium will stabilize any constraint through prices. Again, this is a possibility, but it is hard to accept that

[40] As explained in Chapter 2, the fuel price elasticity of supply measure how changes in the price of fuel affects the quantity supplied. As the factors that affect supply cannot be easily nor cheaply changed the supply of fuel is quite inelastic and likely to become even more inelastic with time, as the new oil fields that are being found and the unconventional oil are more expensive and slower to develop than were past discoveries.

government would allow the degree of oscillation on fuel prices, that might occur in an unregulated market, go beyond the current levels. Thirdly, the viability of alternative fuels and technologies is dependent on fossil fuel prices. The third point is probably the most accurate. Indeed, non-traditional sources of energy and new technologies are greatly dependent on the prices of the traditional forms of energy (Rotz, 2009).

To assume fuel prices remain constant and have no effect on fuel consumption might impose premium risks to the analysis as an underestimation of total economic impacts. If fuel prices are high, fuel substitutes and new technologies become more attractive and are developed faster, as past experiences have showed (Gielen and Unander, 2005). Thus, if fuel prices increase unboundedly, then alternatives will become feasible. Hence, there would be reductions in the total impacts of fuel constraints. In contrast, higher fuel prices can aggravate fuel constraints impacts. Higher oil prices affect negatively the economy, by reducing employment, wages, economic activity (trade) and GDP (Keane and Prasad, 1996, Davis and Haltiwanger, 2001, Jiménez-Rodríguez and Sanchez, 2005). Furthermore, the effects of oil price variations will be different depending on the circumstances in which they happen: if a price increase is followed by another price increase or by a price decrease (Hamilton, 2003) and by how much; if it happens in a stable or unstable price environment; if the country is a net oil importer or exporter (Jiménez-Rodríguez and Sanchez, 2005); and the dynamics of the price variation. All these conditions will influence the extent that the price variation impacts on the economy, and should be analysed if a price consideration approach is taken.

Moreover, supply constraints are more effective in motivating behavioural changes than fuel prices rises because people prefer functionality over feasibility[41] (Krumdieck *et al.*, 2004). Thus, the debate on how prices will behave when fuel constraints occur, and how it will impact the economy and transport, can easily become a very dense dispute and it is not the purpose of this thesis to resolve this matter.

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[41] Assuming people are rational, they act to maximise utility, when studying consumers preferences, the primary needs of all consumers is over their individual desires (Krumdieck *et al.*, 2004). Lee and Zhao (2014) details that consumers "display inconsistent preferences over time when the decision involves trade-offs between desirability and feasibility: they choose options high in desirability for distant-future decisions but prefer options high in feasibility as the time of implementation draws near".

One way to reduce the risk of ignoring price effects is to apply an I-O price model. A fundamental part of this model is to determine the changes in value added and the price spike caused by peak oil. As stated before, it is difficult to predict future oil prices. Looking again at oil prices between 2006 and today (money of the day - unadjusted), depicted in Figure 5.5 and covering a larger period of time, since 1861 to 2013 (2013 dollars), in Figure 5.6 some conclusions can be drawn.

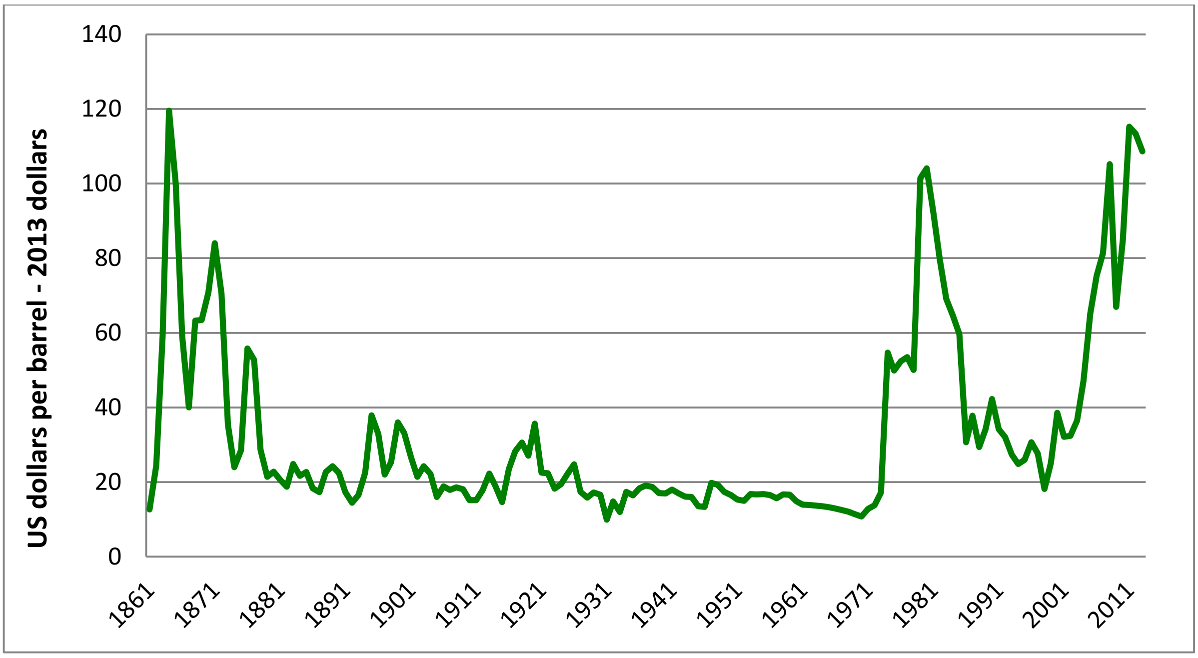

Figure 5.6: Crude oil prices between 1861 and 2013
Source: BP Statistical Review 2014[42]

From Figure 5.6 some price swings are clearly observed, especially in times of shortage or oversupply. Initially, in the second half of the 19th century, there was the first oil boom, with the price reaching USD120 dollars/barrel during the ‘Pennsylvania rush’, when its wells were producing about one third of the world’s oil (Eno, 2014). After that the prices remained more or less constant at around USD20 dollars a barrel until the end of 1973, when prices surged during the Arab-Israeli War and when the OPEC imposed an oil embargo against the USA. The high prices continued, hitting a new high of more than USD100/barrel in 1979-1980, during the Iranian Revolution (Iran and Iraq had their production severely cut).

[42] 1861 to 1944 US average data, 1945 to 1983 Arabian Light posted at Ras Tanura, and 1984 to 2013 Brent Crude

Prices reduced drastically and the average between 1986 and 2003 was around USD30/barrel, due to declining global oil demand, increasing non-OPEC oil production and Saudi Arabia increasing its oil production (1986) and the Asian financial crisis (1999). By 2003 prices started to rise again, reaching over USD100/barrel in 2007, caused by a combination of factors: a Venezuelan strike, the invasion of Iraq, a production decline in some countries, hurricanes in the Gulf of Mexico in 2005, an increase in Asian demand and a weak US dollar. After a quick decline in the middle/end of 2008 and 2009, related to the economic crisis in most developed countries, it rose again in 2010 after the tensions in the Arab countries (Arab Spring) to remain over $100/barrel up to late 2014.

In the end of 2014 prices started reducing again, reaching USD60/barrel in the end of December. The cause of this rapid decrease in price is simple economics (demand is down and supply is up) added to political decisions. Demand declined due to high oil prices and slowdowns in big economies, such as China and Germany. The high oil prices also induced some companies to begin extracting oil from difficult-to-drill places (shale oil in USA and oil sands in Canada) and an easing of the geopolitical tensions in Arab countries, with an increase in production in Libya and Iraq.

Some people argue that the resurgence of US oil production and the decline in price indicate that Peak Oil is not going to happen, but as explained previously, Peak Oil means a decrease in production of oil, with more oil having to come from more difficult sources, with higher extraction and processing costs and lower quality. However, the increase in production and the advances in technology were only possible because of high oil prices. So, it is expected that prices will have to rise again to sustain the many new oil wells. Also, as explained in the economics of peak oil (section 2.4.1) price fluctuations are expected after peak oil is reached, due to shifting between demand destruction[43] and small supply increases. So, it is possible that the price fluctuations that are currently happening may indicate that peak oil has already been reached or is very near.

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[43] Demand destruction is used to describe the elimination or substantial reduction of the need for a resource (normally refers to oil or energy products) on a near-permanent basis.

For the sake of predicting future oil prices to allow a monetary constraint analysis, and taking into account the past oil crises and shocks the world has gone through, a price increase of 50% to simulate the impact of oil supply limitations (such as observed in summer 2008) has been assumed. Since the I-O data for New Zealand used in this analysis was updated for 2009, they implicitly assume 2009 prices. In the end June 2009 average year prices in New Zealand were NZD 1.71/litre, while crude oil was an average USD 67/barrel. A 50% increase, from USD 100/barrel to USD 150/barrel means a 123.9% increase in comparison to 2009.

5.2. Economic Impacts of Fuel Constraints in New Zealand – Physical Constraint

This section applies the mixed input-output model to New Zealand. The application helps in the visualisation and better understanding of how to apply the I-O model. New Zealand is a developed country, and the economy is extremely reliant on imported cheap fossil fuels, as previously mentioned. When peak oil happens, New Zealand would be soon affected. It is assumed that the constraint caused by peak oil will be a 2% per annum reduction. This is treated as a 2% reduction in the total output (demand) of the fuel sector in New Zealand. Thus, the reduction of output of the constrained sector is calculated by multiplying the original sectorial output by a factor of 0.98.

The next step is to calculate the impacts on the unconstrained sectors and impacts on final demand and value added of the constrained sectors. The primary way to compute these impacts are expressed in Equation 2.12. To simplify the procedure, the equation was subdivided into two. Equation 5.1 is used to calculate the final outputs of the unconstrained sectors after the supply constraint, X_s. Equation 5.2 is used to compute the final demand of the constrained sectors after the supply constraint, Y_r.

$$X_s = (1 - A_{ss})^{-1}(A_{sr}\overline{X}_r + \overline{Y}_s) \tag{5.1}$$

$$Y_r = (1 - A_{rr})\overline{X}_r - A_{rs}X_s \tag{5.2}$$

where:

$\overline{X}_r =$ output of constrained industry;

X_s = output of unconstrained industry after supply constraint;

A_{rr} = direct requirement matrix of transactions between the r constrained industries;

A_{sr} = direct requirement matrix of coefficients of inputs by the s unconstrained industries of the r constrained industries outputs;

A_{rs} = direct requirement matrix of coefficients of inputs by the r constrained industries of outputs by the s unconstrained industries;

A_{ss} = direct requirement matrix of transactions between the s unconstrained industries;

Y_r = vector of final demand for the production of the r constrained industries; and

$\bar{Y}_s$ = vector of final demand for the production of the s unconstrained industries.

As explained in section 2.1.1.3, the model is partitioned into constrained and unconstrained sectors. The subscript r designates variables related to the constrained sectors. The variables related to the unconstrained sectors are indicated by the subscript s. For visualization purposes, a reduced I-O table for New Zealand is presented in Table 5.1, in which sectors are aggregated and only total final demand and value added are shown.

Table 5.1: Reduced transaction table for New Zealand 2009 (Million NZD)

Industries	Agri-culture	Mining	Fuel	Manu-facture	Construc-tion and Trade	Freight Trans-port	Services	Final demand	TOTAL OUTPUT
Agriculture	5,054.1	3.3	1.3	14,552.1	1,433.9	30.9	709.5	4,339.6	26,124.7
Mining	132.3	169.8	149.2	626.3	301.6	17.8	68.8	427.8	1,893.7
Fuel	549.2	271.9	3,716.3	1,627.9	2,261.8	457.8	554.4	153.9	9,593.2
Manufacture	3,085.8	63.1	220.5	15,127.0	11,397.3	220.6	4,414.2	46,462.4	80,990.8
Construction, Trade, Passenger Transport	2,049.3	284.3	387.1	4,996.7	20,641.2	969.2	9,762.2	65,579.9	104,669.9
Freight Transport	785.2	141.5	80.3	2,312.6	1,869.6	1,712.3	524.8	1,175.0	8,601.3
Services	3,102.5	138.1	346.6	6,467.6	16,414.0	1,277.0	40,125.4	82,472.7	150,343.8
Imports	1,961.9	30.2	0.0	9,616.2	10,680.2	339.1	6,151.7	30,674.3	59,453.8
Value Added	9,404.4	791.4	4,691.9	25,664.3	39,670.3	3,576.7	88,032.8	12,781.7	184,613.6
TOTAL INPUT	26,124.7	1,893.7	9,593.2	80,990.8	104,669.9	8,601.3	150,343.8	244,067.4	626,284.7

The total output of the fuel sector is NZD 9,593.2 million. After the reduction in fuel availability, the total output is predicted to shrink to NZD 9,401.3 million. This NZD 191.9 million reduction in total output of the fuel sector represents a 0.03% decrease in the total economic output.

The computation of the impacts on the unconstrained sectors and the total impacts on the economy of New Zealand is made by applying Equation 5.1 and 5.2, and the results are shown in Table 5.2 and Table 5.3. Table 5.2 shows the values of the two unknowns (endogenous variables) of the equations, the output of the unconstrained sectors and the final demand of the constrained sector. Considering the new values presented on Table 5.2, the new transaction table is calculated and Table 5.3 displays it after the supply constraint.

Table 5.2: Endogenous variables results after supply constraint

$X_s =$	26,124.1	Agriculture
	1,890.8	Mining
	80,982.0	Manufacture
	104,656.5	Construction, Trade, Passenger Transport
	8,598.6	Freight Transport
	150,328.8	Services
$Y_r =$	37.8	Fuel

Table 5.3: Transaction table with the supply constraint (Million NZD)

Industries	Agri-culture	Mining	Fuel	Manu-facture	Construc-tion and Trade	Freight Trans-port	Services	Final demand	TOTAL OUTPUT
Agriculture	5,054.0	3.3	1.3	14,552.0	1,433.8	30.9	709.4	4,339.6	26,124.1
Mining	132.3	169.5	146.2	626.2	301.5	17.8	68.8	427.8	1,890.1
Fuel	549.1	271.4	3,642.0	1,627.6	2,261.5	457.6	554.4	37.8	9,401.3
Manufacture	3,085.7	63.0	216.1	15,124.8	11,395.9	220.5	4,413.7	46,462.4	80,982.0
Construction, Trade, Passenger Transport	2,049.2	283.8	379.3	4,996.1	20,637.7	968.9	9,761.5	65,579.9	104,656.5
Freight Transport	785.2	141.3	78.7	2,312.3	1,869.5	1,711.9	524.8	1,175.0	8,598.6
Services	3,102.4	137.8	339.7	6,466.8	16,412.4	1,276.5	40,120.4	82,472.7	150,328.8
Imports	1,961.9	30.2	-	9,615.0	10,678.5	338.9	6,151.1	30,674.3	59,449.8
Value Added	9,404.3	789.9	4,598.0	25,661.3	39,665.8	3,575.6	88,024.8	12,781.7	184,501.4
TOTAL INPUT	26,124.1	1,890.1	9,401.3	80,982.0	104,656.5	8,598.6	150,328.8	243,951.2	625,932.7

A 2% reduction on total output of the fuel sector initially caused a 75.4% decrease in the final demand of the constrained sector, from \$153.9 million to \$37.8 million, as shown in Table

5.1, Table 5.2 and Table 5.3. This change affects the unconstrained sectors because fuel is an input factor for all other industry sectors (agriculture, mining, manufacture, construction, trade, transport and services). Thus, unconstrained sectors will reduce their total outputs due to the backward linkages they maintain with the fuel sector, affecting the entire economy. Table 5.4 shows the percentage variation for each sector after imposing the supply constraint.

Table 5.4: Percentage change of the transaction table after the constraint

Industries	Agricul-ture	Mining	Fuel	Manu-facture	Construc-tion and Trade	Freight Trans-port	Services	Final demand	TOTAL OUTPUT
Agriculture	0.00	-0.19	-2.00	0.00	-0.01	-0.03	-0.01	0.00	0.00
Mining	0.00	-0.21	-2.00	-0.02	-0.02	-0.02	0.00	0.00	-0.19
Fuel	0.00	-0.17	-2.00	-0.02	-0.02	-0.06	-0.01	-75.45	-2.00
Manufacture	0.00	-0.19	-2.00	-0.01	-0.01	-0.05	-0.01	0.00	-0.01
Construction, Trade, Passenger Transport	0.00	-0.19	-2.00	-0.01	-0.02	-0.03	-0.01	0.00	-0.01
Freight Transport	0.00	-0.16	-2.00	-0.01	-0.01	-0.02	-0.01	0.00	-0.03
Services	0.00	-0.19	-2.00	-0.01	-0.01	-0.04	-0.01	0.00	-0.01
Imports	0.00	-0.23	0.00	-0.01	-0.02	-0.05	-0.01	0.00	-0.04
Value Added	0.00	-0.19	-2.00	-0.01	-0.01	-0.03	-0.01	0.00	-0.07
TOTAL INPUT	0.00	-0.19	-2.00	-0.01	-0.01	-0.03	-0.01	-0.05	-0.06

Table 5.4 shows that the reductions of output of the unconstrained sectors are rather minor in value terms, both absolute and relative, and were all less than 0.25%. In relative terms the mostly affected sector (excluding fuel) is the mining sector, with a reduction of 0.19%, followed by freight transport (0.03% reduction), because mining and freight transport are highly dependent on fossil fuels. However, in absolute values the freight transport sector had the second smaller reduction in the total output, \$2.7 million. This is due to the small share that the transport sector plays on the total money flow of the economy. Conversely, in absolute values, the services sector presented the higher output decrease, \$15 million, followed by the construction, trade and passenger transport sector, which shrinked \$13.4 million. This is caused by the industries' importance in the total output of the economy and also its direct backward linkage with the fuel industry. Even though the absolute declines on both sectors were high, it represented only a 0.01% drop of output of this sector.

The above analyses are considering the combined sectors, as the original table has 51 sectors[44]. When analysing the full I-O table (Appendix C.1.), the sectors with higher percentage decline are the other mining and quarrying, with 0.27% and the water freight transport, with 0.21% reductions. In total values, the sectors more affected by the constraint are the construction (NZD 7.1 million) and the scientific research and computer services (NZD 5.1 million), followed by the other business services (NZD 3.8 million), finance and insurance (NZD 3.3 million) and other mining and quarrying (NZD 3.2 million) sectors. Some of these sectors are big, in terms of total output, e.g. finance and insurance (NZD 22,598.3 million or NZD 22.6 billion) and other business services (NZD 21,212.7 million or NZD 21.2 billion), while others are quite small, e.g. other mining and quarrying (NZD 1,177.2 million or NZD 1.2 billion) and water freight transport (NZD 655.8 million). Hence, the economic contraction of sectors is related to the interdependency each sector has with the fuel sector and vice-versa and the fuel intensity of the industry.

Comparing the total input of New Zealand with and without the constraint, the cutback would be NZD 352 million, from $626,284.7 million to $625,932.7 million. This corresponds to a 0.06% contraction of the total economy. This might seem insignificant, but the absolute value corresponds to more than 7% of the local inputs of the fuel sector or almost 20% of the total inputs of the mining sector.

Table 5.2 show the results of the mixed I-O model, i.e. the output of the unconstrained industries and the final demand of the constrained industry. Thus, the model does not detail the final payments to the final demand sectors, and as a consequence the total economic output cannot be calculated. It also does not include the complete end result of the value added (separated into the household, other payments and imports) and final demand sectors (separated into the households, other local final demand and exports). These downsides are caused by the model's inability to describe the transactions within these sectors.

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44 The model was applied to the full I-O table. If one applies it only to the reduced table, the results are different. To simplify the presentation of the results the analyses show only the reduced table, but the full table can be found in the appendices.

To simplify the modelling, it was assumed that the final payments made to the final demand sectors remained constant. Observe that in Table 5.4 the value added to the total final demand had a zero percent variation. This assumption can be justified using the fact that all final demands of the unconstrained sectors remained constant after the fuel constraint (zero percent variation). However, if a reduction of final payments made to the final demand sectors is experienced it could greatly impact the final results. For instance, the reduction of total value added for the fuel sector corresponded to 48.9% of the total impact on the fuel sector or 26.7% of the total economic impact. The reduction of value added for the other sectors varied from 33.6% to 53.4% of their sectorial impact and together (except fuel) represented an additional reduction in gross output of 5.2%. Thus, if the final payments made to the final demand sectors suffer with the fuel constraints, the impacts on total output could greatly influence the final result. However, this is one of the model's assumptions, that final demand of unconstrained sectors remains unchanged.

In relation to the other downside (the inability to describe the transactions within final payments and final demand sectors), it is assumed that the final payments made to the final demand sectors were maintained in the same proportion. Thus, the direct requirement matrix of coefficients of inputs is used to calculate the end result of the value added, separated into household, other payments and imports.

Regarding the final demand, some inferences can be drawn by observing the economic structure of New Zealand. The fuel's final demand was the only one affected by the fuel constraints, due to the model assumptions. This final demand includes exports of fuel; household consumption of fuel (to heat houses, fuel cars and other domestic uses); and other local final demand, which comprise government consumption, stock change and gross investment. Considering that unfinished projects would likely continue even after an initial reduction in fuel supply, plans for other investments would not immediately change and government expenditures would continue as planned beforehand. It can be argued that government consumption and investments would have the smallest reductions of output. On the other hand, the stock changes would probably be reductions larger than the reduction in the previous year. This would reduce the risks of maintaining high fuel stocks during a shortage. Thus, it is plausible that the private consumption of fuel would be the most affected final demand sector, since domestic consumption generally has a higher capacity to adapt than industry demand. It is likely people would become more careful regarding the number and distance of car trips, and shift to other forms of energy to maintain their lifestyle.

All the analyses done so far were for an open economy. If the household sector was included as an endogenous sector (a common practice), the impacts would be significantly bigger. Closing the New Zealand economy with respect to households and imposing the same 2% fuel constraint, the total economy would decline by 15.7% to NZD 527,692.3 million (Appendices C2 and C3). Thus, in a closed economy the impacts are more than two hundred and fifty times bigger. The greater impacts in the closed economy are explained by the fundamental role the household sector plays in buying the outputs of the entire economy, and are also related to the fact that this model is relatively aggregated.

Finally, it is useful to perform a sensitivity analysis of the model to different fuel constraints, so several scenarios of fuel constraints were investigated. The investigated constraints were 5%, 10% and 20% reductions of fuel availability. The results of the model sensitivity are illustrated on Figure 5.7.

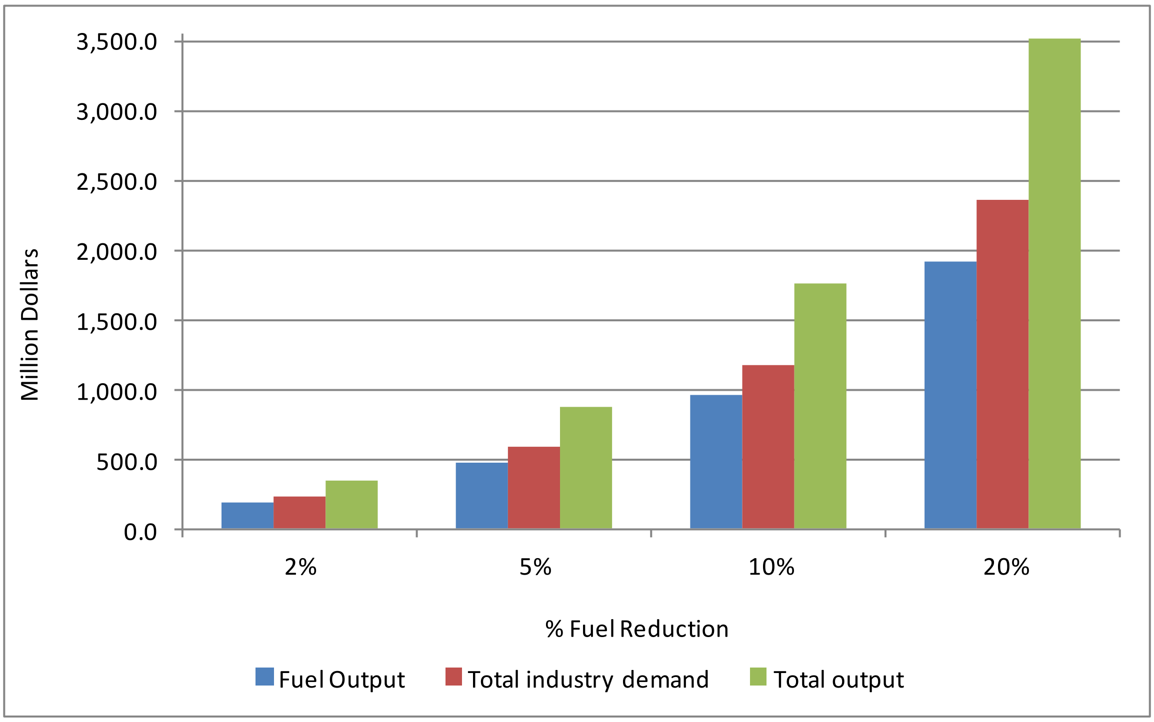

Figure 5.7: Economic impacts of different scenarios of fuel reduction (NZD million)

A straightforward direct linear relationship between impacts and fuel constraint is revealed in Figure 5.7. Thus, the 40% fuel constraint would produce impacts two times higher than the impacts caused by the 20% constraint, and the 20% reduction would produce impacts 2 times higher than the impacts caused by the 10% fuel reduction. Thus, according to this model, the impact on total output of a scenario of zero fuel available would be $17,599.8 million, which represents 2.8% of the total economy. It is highly improbable that if there is no oil available, the total economy output will reduce only 2.8%, even with full efficiency and economic viability of all existent substitutes for oil.

However, it just highlights the fact that this model results provide a rank on how sectors will be affected, considering a demand driven approach. It also demonstrates that the model does not produce good results for drastic changes in fuel supply. However, in a closed economy, the impacts do not vary significantly with variations of fuel constraint. This is due to the most important factor affecting the economy would actually be the relationship the household sector has with the other sectors of the economy.

5.3. Economic Impacts of Fuel Constraints in New Zealand – Monetary Constraint

This section applies the I-O price model to New Zealand. Other authors have previously analysed the impacts of peak oil using a price model (Kerschner *et al.*, 2013, Logar and van den Bergh, 2013). According to the literature, there are two kinds of I-O price models that can be used: the Gosh Price Model (GPM) and the Leontief Price Model (LPM). There are a lot of discussions on how correct the GPM is, and Davar (2005) concludes that the GPM is “both erroneous and unworthy of consideration”. Thus, it was decided to take into consideration only the LPM.

In the LPM quantities are fixed and prices change, which enables assessment of the effects of a price change in the value-added expenditures (i.e. a price change of any primary input) or in the direct requirements table (Steenge and Duchin, 2007, Miller and Blair, 2009, Logar and van den Bergh, 2013), for example how prices throughout the economy would be influenced by a substantial pay rise (Kerschner, 2012). In this model the final demand has no role in the price formation and it assumes fixed input coefficients (same as the traditional I-O). To derive the model from equations 2.1 to 2.6 it is possible to obtain Equation 5.3 and derive it to Equation 5.4 (Kerschner *et al.*, 2013).

$$i' = i'A + v_c' \tag{5.3}$$

where:

A = matrix of technical coefficients, the inputs required to produce one dollar worth of output for each sector,

i' = row vector of ones;

v_c' = row vector of value added input coefficients, denotes the value added (capital, labour, taxes and imports) required to produce one dollar worth of domestic sectorial output.

$$\tilde{p} = (I - A')^{-1} v_c \tag{5.4}$$

where $\tilde{p}$ is a base year index prices (column vector of normalised prices). Since the price of one unit of output is by definition one dollar, $\tilde{p}$ would be a vector of ones.

So, a variation in v_c (column vector of value added input coefficients) would lead to both a direct and an indirect price increase in the whole economy due to the interdependency of economic sectors, "as firms compensate their unit cost increases in their output prices. The subsequent endogenous increases in intermediate input prices again cause output price to rise, the cumulative effect of this cost-push process is expressed" (Oosterhaven, 1996) in equations 5.4 and 5.5. So, after a change in the technical coefficients due to changes in the value added, the normalized prices would change accordingly. These modified prices are represented in Equation 5.5

$$\Delta\tilde{p} = (I - A')^{-1} \Delta v_c \tag{5.5}$$

Equation 5.5 means that primary input prices ($\tilde{p}$) may change exogenously and the direct effect of such changes on endogenous unit cost is determined by variation related to production changes.

To apply Equation 5.5 the first step is to determine the price increase due to peak oil. The considered increase is 123.9%, in comparison to 2009 crude oil prices. However, it was observed, from the oil price variation in New Zealand[45] (MED, 2014) that the price fluctuations in the country are less than the crude oil fluctuations, in general 20 to 40% lower. Thus, it is reasonable to assume a 100% price increase compared to 2009 prices. It was considered a price increase of 100% in the ‘fuel sector’, which includes oil and gas extraction, production & distribution and petroleum refining, product manufacturing sectors. Gas and oil are close substitutes and it is often mentioned that Peak-Oil will be closely followed by a peak in gas production (Bentley, 2002, Aleklett and Campbell, 2003).

To generate the 100% price increase in the fuel sector output, the value added had to be increased by 204%. This was achieved by raising all sectors in equal shares: imports, compensation of employees, depreciation and operational surplus and net indirect taxes. Also, the oil and gas imports of all sectors were increased by 100%. Price increases in other sectors, which are dependent or related to fuel prices, were not included in this analysis. For instance, coal prices, have a strong relationship with fuel prices as substitute energy production, which has a share of fuel oil and gas as primary input. These other sectors were analysed by the ripple effects[46] of the model.

The price increases of outputs in each sector of New Zealand resulting from price increases in fuel and value added sectors are presented in Table 5.5. In this way, the model calculated direct and indirect price increases in all sectors due to a Peak-Oil induced price increase.

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[45] Available at http://www.med.govt.nz/sectors-industries/energy/liquid-fuel-market/weekly-oil-price-monitoring.

[46] The model calculates the extent to which some initial, "exogenous" force or change is expected to generate additional effects through interdependencies associated with some assumed and/or empirically established, "endogenous" linkage system.

Table 5.5: Percentage price variation in all other sectors after fuel price increase

Industry		Price change (%)
8	Coal mining	50%
19	Fertiliser and other industrial chemical manufacturing	43%
10	Other Mining and quarrying	41%
35	Water freight transport	40%
26	Electricity generation, transmission and distribution	30%
37	Other passenger transport and transport services	20%
36	Other freight transport (pipeline) and freight transport services	20%
6	Forestry and logging	19%
32	Road freight transport	19%
33	Road passenger transport	18%
18	Printing, publishing and recorded media	17%
7	Fishing	16%
34	Rail freight transport	16%
17	Paper and paper product manufacturing	15%
4	Other farming	15%
16	Wood product manufacturing	15%
5	Services to agriculture, hunting and trapping	15%
2	Livestock and cropping farming	13%
21	Non-metallic mineral product manufacturing	13%
3	Dairy and cattle farming	12%
11	Meat manufacturing	12%
22	Basic metal manufacturing	11%
12	Dairy manufacturing	11%
20	Rubber, plastic and other chemical product manufacturing	11%
13	Other food manufacturing	10%
25	Furniture and other manufacturing	10%
15	Textiles and apparel manufacturing	9%
28	Sewerage, drainage and waste disposal services	8%
23	Structural, sheet and fabricated metal product manufacturing	8%
30	Wholesale and retail trade	8%
29	Construction	7%
1	Horticulture and fruit growing	7%
24	Machinery and other equipment manufacturing	7%
45	Local government administration	6%
31	Accommodation, restaurants and bars	6%
44	Central government administration and defence	5%
14	Beverage, malt and tobacco manufacturing	5%
47	Other education	4%
42	Scientific research and computer services	4%
49	Other health and community services	4%
43	Other business services	3%
41	Equipment hire and investors in other property	3%

Table 5.5: Percentage price variation in all other sectors after fuel price increase (continued)

27	Water supply	3%
51	Personal and other community services	3%
48	Hospitals and nursing homes	3%
50	Cultural and recreational services	3%
38	Communication services	2%
46	Pre-school, primary and secondary education	2%
39	Finance and insurance	2%
40	Housing: Real estate and Ownership of owner-occupied dwellings	1%

As observed (and expected) the highest price increases are in the coal mining sectors, coal being one possible substitute for fuel, especially in New Zealand. It is followed by fertiliser and other industrial chemical manufacturing (19) and other mining and quarrying (10), which are dependent on fuels. Another sector that is affected substantially is electricity generation, as in New Zealand approximately 29% is produced from gas or coal[47]. When production prices of a sector increase significantly, demand will suffer according to the price elasticity of its products. In the case of coal, for instance, a 50% real price rise in coal could lead to a 45% reduction in the long term quantity demanded of the product (Morris, 1997).

The six transport-related sectors lie within the 13 most affected sectors. Unexpectedly, the most affected among them was water freight transport, which was expected to be one of the least fuel intense, compared to road or rail. The next most affected groups of sectors embrace wood/paper related sectors (forestry and logging; printing, publishing and recorded media, paper and paper product manufacturing), fishing and farming. The least impacted are the service sectors.

5.4. Impacts on Freight Transport

The impacts on freight transport are based on the analysis of the physical constraint, in monetary terms (section 5.2). This is the model that feeds the freight transport model. One assumption of the freight transport model is that the economic trade between regions can well

[47] According to data from the Ministry of Business, Innovation & Employment, taking the year ended in June, the average over the last ten years is 29%, it was 29% in 2009, 37% in 2006 (date of the original table) and it was 21% from September 2013 to June 2014. There is a gradual shift to more renewable sources, such as hydro and geothermal.

describe the freight transport movements. Thus, the price analysis made in section 5.3 should not be used to forecast freight movements.

As previously mentioned, "the reductions of output of the unconstrained sectors are rather minor in value terms, both absolute and relative; and were all less than 0.25%" (page 182). When bringing these changes to the freight model and considering the remaining indicators constant (value density, mode split, average trip load per vehicle type and pcu per vehicle type) it was observed that the impacts were all minor too. The total reduction in transport flows was 0.07% or 9,602 trips a year (4,801 for production and for generation), equivalent to 3 pcu/h.

The physical constraint had no impact on the trip distribution and so a new model was not necessary. The most affected vehicle industry was 'other', which is a combination of the fuel and wood sectors, caused by the impact on the fuel sector. 'Other industry' had a total reduction of 0.5% and corresponded to 37.1% of the total impact on freight transport movements.

This small impact is related to the minor economic impacts and is also due the fact that, in absolute values, the most affected sectors were the services industries. The services industries do not produce flows of goods and were excluded from the freight modelling, as explained in Chapter 4.

Although the impacts were small for this specific simulation, results from Kerschner (2012) show differences for net-oil exporting and net-oil importing countries. In his analysis, other countries' impacts were between 3.3 and 7.3 times bigger than those for New Zealand. Industries most affected in all countries include transportation, electricity production and financial and trade services. Industries most affected in all countries include transportation, electricity production and financial and trade services. Again, the most impacted industries were services industries, but if doing a freight analysis based on input-output models (as done in this study), there is a high likelihood that the impacts on freight transport would appear to be small, because of the way transport is treated in such models. Some characteristics of each country (e.g. the composition of freight movements, the characteristics of the road network, the goods production and flows and the mode split) could also impact on the analysis.

Regarding the mode split, it is important to highlight that the freight transport model is flexible and able to be adjusted to other mode shares. One possible analysis is to identify what would be the impacts if, after 'peak oil', there is freight transfer between modes. Then, a new mode split can be defined and the model can be estimated again. Another possible way is to not 'fix' the mode split but to nest it within the model, by combining it with the trip distribution step or including it within the assignment step, using, for instance, the logit model. Thus, the mode split would be open to change and adjustment to the new characteristics of the goods movement task or transport system.

5.5. Other Impacts of Peak Oil

The main fuel constraint studied in this research is peak oil. When peak oil occurs, production is expected to reach a plateau and then start to decline. Although the rate and time of decline is still uncertain, the impacts of such an event are likely to be great. Many scientists and analysts have predicted the impacts of peak oil. Some of the most cited impacts are:

- Energy prices will go up dramatically;
- Strong commodity based inflation (Deneen, 2008);
- Increased interest rates and slowed economy;
- High unemployment;
- Severe contraction in the world economy, recession and prolonged economic depression;
- Economic decline will be at the same rate of oil decline (Hirsch, 2008);
- Collapse in bank systems;
- Price increase of nearly every commodity and product;
- Food and agriculture industries will be more affected. Significant food shortages and sharp increases in food prices (Church, 2005);
- New energy environment;
- Recycling markets will grow up and will be more cost effective;
- Delivery services will raise their rates

Most of these claims are speculations, and not scientifically established. Hence it is essential to use a reliable method to calculate the economic impacts of peak oil and check the validity of the above claims. It is even more important to apply systematic techniques before major policies are adopted and resources are invested. On the other hand, any model has limitations and there is no single model that is able to incorporate all the aspects of peak oil and account for all the impacts of such an event. Still, it is likely that not all the estimated impacts will happen. The application of the mixed I-O model has shown that some of the claims are rather pessimistic.

5.6. Concluding Remarks

Chapter 5 conceptualizes the model to calculate economic impacts of fuel constraints. The model is based on Input-Output models. A mixed I-O is used to evaluate impacts of scenarios of fuel constraints for different sectors of the economy, with a monetary perspective. Also, a priced model (LPM) is used to evaluate impacts of a price increase for the economic sectors.

It was observed that the mixed I-O showed insensitivity to a small change in fuel availability. There is a view among Government officials and industry that if fuel availability is constrained, then priority access will be given to some users. Also, many governments have fuel rationing plans (New Zealand certainly does) ready for implementation if fuel availability becomes constrained. The model does not allow explicitly for such effects. For instance, it can be argued that fuel used in the health sector or for food production should receive priority over private transportation use. This strategy could bring more severe impacts for the whole economy than the estimated above, as the reduction would not be so linear or simple to predict.

Another simplification of the model is that the international perspective of Peak-Oil was not taken into account, as only New Zealand was analysed. For example, the reduction in fuel availability to some sectors would impact upon the exports to other countries, on the prices and/or the quantities supplied. So, one country would be affected by the impacts in the other. This cycle is not considered in this analysis and is a source of under-estimation of overall impacts.

The LPM, on the other hand, showed higher impacts than the mixed I-O. That is also explained by the high price increase (100%) compared to the reduced availability of only 2%. The most affected sectors were mining, fertilizers, electricity production and several sectors related to transport services. These are all sectors that are fuel intense and policy makers should have these sectors in mind when preparing action plans during fuel crisis.

6. CONCLUSIONS AND DISCUSSIONS

This chapter summarises the findings of this research. It highlights the main results showing how fuel constraint affects freight transport and the national economy. Additionally, a critical analysis of both contributions and limitations of the research method, and recommendations for future research endeavours, are given.

The chapter is divided into four sections. After this brief introduction, research findings are summarised. The second section is dedicated to an evaluation of the proposed research method (i.e. MRIO, transport and fuel constraints analysis), with limitations being identified in the third subsection. Finally, the last section lists some recommendations and suggestions for future research.

6.1. Research Findings

This research achieved a number of findings relating to the economic, transport and fuel availability fields, in the context of national economies. Overall, the findings were elucidative for both the academic and practitioner perspectives. The following list enumerates the most significant research findings from the literature review, economic and transport analyses, as well as the fuel constraint analysis.

- A comprehensive review of Economic Impacts models has indicated that General Equilibrium methods are the most suitable for this research. Among the modelling options, Input-Output analysis appeared as the best model to evaluate the economic impacts of oil supply shocks, as it allows for modelling the interactions among sectors and markets, as well as requiring less data when compared to similar models.
- Variations from the traditional Leontief methods were identified and the supply constrained I-O model was successfully applied to estimate short-run effects of oil supply shocks.
- Regarding freight modelling, in spite of the long history of four-step models, the traditional approach (i.e. performing the steps individually) was considered not appropriate given the research needs. The Literature Review indicated that combined models are more suitable as they can be linked to I-O models, allowing one to perform

the trip generation step followed by a simultaneous trip distribution and assignment. Such an approach guarantees that the equilibrium is reached and the errors are minimized.

- A national I-O model and a MRIO model were applied to New Zealand's economic system and while transactions between sector and regions were adequately identified, with errors in the expenditure GDP varying from zero to 1.1%, the need to update I-O tables have been shown to be troublesome and data intensive.
- The economic analyses conducted has contradicted widely held vows regarding the New Zealand economy; for example, the I-O table shows that the national economy is highly dominated by services and trade industries (41% of the total economy), not tourism, primary industries and international trade, as widely stated. In addition, the manufacturing sectors represent 37.47% of the total output compared to 11.2% from the agricultural sectors, contrary to the view that the country is an export-oriented agricultural economy.
- A method to model freight transport was presented using MRIO and the combined modelling approach, allowing for modelling current freight transport movements, and to estimate impacts of future scenarios.
- A process of four steps to generate transport data from MRIO outcomes was proposed and proven feasible in the context of the present research. Overall, an intensive process needs to be followed to transform pecuniary terms to physical terms, allowing the dollar values from MRIO to be assigned as freight flows.
- General and spatial data sets from Statistics New Zealand (SNZ), New Zealand Transport Agency (NZTA), Land Information New Zealand (LINZ) and Ministry of Transport (MoT) were gathered and treated for the specific research purpose posed in this thesis. It was concluded that the available information from national institutions could suffice the modelling needs.

The application of the proposed freight transport analysis for New Zealand allowed the identification of the following specific characteristics of this type of analysis to the country.

- To geographically allocate and estimate internal trade among NZ's regions, the physical location and movements of good to/from seaports and airports were taken into consideration.

- 51 sectors from I-O tables were reduced to 26 sectors, which represent industries that generate freight flows.
- Data representing the value and weight (tonnes) of exports and imports for the period 2003 to 2009 were gathered in order to allow a comparative analysis of the value density of commodities. Subsequently, the commodity database was aggregated and divided into the 26 I-O industries that generated freight.
- Mode split (road, rail and water) per industry, presence of transport modes per region and Road User Charges (RUC) data were used to generate the percentage of trips and average weight carried by vehicle type.
- Total road freight traffic was converted to an equivalent number of cars (Passenger Car Units - PCU), and traffic flow produced and attracted by region and industry were generated. Overall, in terms of freight production and attraction the five most important regions were (in decreasing order) Auckland, Taranaki, Waikato, Canterbury and Bay of Plenty.
- A series of scenario analyses indicated that traffic flows on links were small compared to link capacities. Also, the freight movement activity can be logistically adjusted to avoid peak times, traffic time restrictions, etc. Hence, high impedance was assumed for known congested areas and medium impedance was assumed for links with some interaction with urban areas and commuting sites.
- Operational speeds have been shown to be about half the average free speed on highways for freight vehicles, due to to the characteristics of the network and the New Zealand geographic terrain, which in some areas are particularly winding and hilly.
- After addressing impedance issues in order to better estimate operational speeds for freight vehicles in New Zealand, individual modelling steps generated two main outcomes: (i) an O-D matrix containing the number of trips (PCU) between each origin and destination pair, by vehicle type and industry and (ii) traffic flows assigned to road network links.
- Performance measurements were calculated by comparing model results with data collected from NZTA's Traffic Management Programme. Performance measurements adopted for this research were in accordance with the Economic Evaluation Manual (NZTA, 2010b), and included link volumes, GEH statistics, % RMSE, journey times and speeds.

The following summarizes the results achieved from the joint MRIO / transport analyses for New Zealand.

- More than half of New Zealand's freight movements relate to primary industry (20.2% - mining products such as coal and other minerals, 16.8% - forestry and logging, 16.7% - livestock, including dairy, cattle and cropping farming, fishing and other farming).
- In terms of tonnage, agriculture, forestry and fishing vehicles, and mining and quarrying vehicles moved a little over 44.5 billion tonnes (about 56% of the total tonnage generated), while manufacturing industries are responsible for approximately 34%, and construction and trade industries moved about 8% of the total tonnage.
- Making use of RUC data and selected vehicle configurations, it was estimated that about 4.5 million freight trips occur per year, 37.1% being associated with the agriculture, forestry and fishing industry, 25.3% being associated with commercial road transport vehicles, mining and quarrying vehicles accounting for 18.3% of trips, and construction and trade vehicles corresponded to 10.7% of the total trips estimated.
- In the regional scale, Auckland is the region that produced and attracted most freight (expected because it is the industrial, commercial and consumption centre of the country), while the second and third biggest generators of freight were Taranaki and Waikato, respectively.
- Three sectors together were responsible for 50% of the total freight produced in the country (i.e. other farming, mining, and forestry and logging).
- Modelled AADT was calculated for each link. The links with greatest traffic are observed in the North Island, especially in the route between Northland and Wellington and between Taranaki and Waikato, while most links with less than 50 trips a day were in the South Island.
- The error between the modelled AADT and the observed AADT was analysed for the three vehicle types (MCV, HCV1 and HCV2), as well as for the total flow.
- The model does reproduce the current freight transport movements among regions, and the impacts of fuel constraints can be assessed using the new MRIO model.

- While fuel constraints can happen due to many reasons (e.g. strikes, natural disasters and trade barriers), the focus of this thesis is the Peak Oil scenario, in which no excess capacity will be available. Due to its transitional nature, no immediate adjustment will likely take place within the economic system.

- General I-O models can be used to calculate the effects of resource constraints in the economy, supply constrained I-O models allow one to consider the sector that is causing the disruption as exogenous to the system, and to estimate the reduction on the constrained sector, and to calculate the impacts on the other (or unconstrained) sectors.
- The mixed I-O model allows for the estimation of reductions in outputs given defined constraints in selected sectors (in the case of this research, the fuel sector).
- Constraints were estimated along physical terms (approximately 2% per annum) and monetary (total reduction of financial flow imposed upon the economy by peak oil).
- The physical constraint analyses have led to a NZD 191.9 million reduction in total output of the fuel sector and a 75.4% decrease in the final demand of this sector. These impacts, added to the impacts on all the other sectors, would mean a NZD 382.4 million cutback, corresponding to a 0.06% contraction of the total NZ economy. Although the overall impact seems insignificant, severe reductions in the fuel and mining sectors (about 7% and 20% respectively) are expected.
- The monetary constraint analysis was performed using the LPM and it was assumed that a 100% fuel price increase would be realistic.
- The modelling exercise indicated the highest price increases would occur in the coal mining sector, followed by the fertiliser and other industrial chemical manufacturing, and other mining and quarrying, which are heavily dependant on low-price fuel.
- Assuming that the economic trade between regions can well describe the freight transport movements, the overall impact reduction in transport flows was estimated at 0.07% or 9,600 trips a year, equivalent to 3 pcu/h. This value indicates no significant impact on trip distribution and traffic flows, so a new transport model was not necessary.

6.2. Evaluation of the Proposed Research and Method

The objective adressed in this thesis was "the identification of the impacts of fuel constraint on freight transport and the national economy". Some models were used to assess the impacts of fuel reductions on freight transport and the national economy: I-O models (traditional, mixed models and priced models), the MRIO model and the combined model. Together they allowed the understanding of the relationships between fuel use, economic systems and transport systems. The models were applied to New Zealand, showing the peculiarities of its economy and freight transport system.

Overall, it is concluded that the MRIO and the combined transport models achieved good results, and reproduced the current freight transport movements among regions. However, many data treatment processes had to be conducted so the modelling could take place. Such processes are possible sources of error and are time consuming, limiting the feasibiliy of systematic use of the models.

Fuel constraint impacts were investigated through the mixed I-O model, which analysed the total reduction of financial flow imposed on the economy by peak oil, and the LPM, which calculated impacts of a fuel price increase. It was observed that the mixed I-O showed insensitivity to a small change in fuel availability. The LPM, on the other hand, showed higher impacts than the mixed I-O. The most affected sectors were fuel intense sectors, such as mining, fertilizers and transport related services.

A major shortcoming of the research method was the inability to calculate the impacts of fuel constraints on freight transport. This is related to the minor economic impacts estimated by the mixed I-O model and also because the most affected sectors were the service industries. Hence, the physical constraint had little (if any) impact on the trip distribution.

It is important to emphasize that the results achieved in this thesis have to be interpreted carefully, given all the limitations. However, the intention of this research is not to deliver final quantitative estimates of the impacts of peak oil, but to assess how a sudden shock might affect the economy in the short term. For this purpose, the proposed I-O model has proven to be valuable. In the future, when longer time series data become available, the model developed in this study could be used to explain the peak oil impacts much better. On the other hand, there is currently no other model that claims to better explain the consequences of peak oil impacts at any level. Once new evidence and date are collected, this model can be re-examined and improved on the basis of the dynamic general equilibrium model.

The main novelty of this research is the way of modelling, which is different to traditional transport modelling. It takes into consideration constraints that freight transport models do not, such as a fuel constraint and enables one to estimate the freight transport impacts and economic impacts of fuel constraints. That is, the research has produced a novel and comprehensive method for assessing the impacts of fuel constraints and interactions between freight transport and the economy.

6.3. Method Limitations

During the development of the method, some drawbacks and difficulties appeared. This section summarizes some of these drawbacks.

The literature review already brings some assumptions of the I-O model that have to be taken as limitations to the model. The mixed I-O, later used to analyse fuel constraint impacts, assumes a fixed matrix A (meaning that input distribution patterns are constant in an economic system) and an unchanged vector of final demand for the unconstrained sectors. The second assumption implies that the unconstrained sectors keep the same level of sales to final markets (households, government, private investments and exports). However, the final demand for the production of the constrained sector varies. This limits the model as the endogenous demand of the unconstrained sectors is reduced, but the imports, exports and household consumption do not change.

The MRIO model also has some limitations regarding the use of non-survey techniques to calculate regional estimates. These techniques traditionally underestimate inter-regional trade and overestimate intra-regional economic activity, generating an overestimation of the interdependence between regions, culminating in inflated multipliers. Another issue in the MRIO is that industry technology and investment patterns for each region are considered the same as for the national economy, and can differ significantly in reality.

The transport modelling brings some specific limitations, especially in terms of data availability, that could bring errors during the process of modelling. These include (i) the number of existing industry and commodity classifications and the compatibility among them; (ii) the data limitations for the conversion of I-O data, to transport data to obtain a dollar per tonne ratio for individual industries; (iii) the use of import and export data as proxies for the products consumed internally to the country; (iv) the use of data on the RUC licences purchased for particular types of vehicles, to define the ratio that converts commodity weight by mode of transport to commodity trips by vehicle type; (v) the procedures to estimate the average load and the percentage of trips by each vehicle class, and the simplification of using a national average of these values for all regions; (vi) the available aerial photographs used to identify the number of lanes (and directions) for links did not offer the appropriate resolution in many parts of the network; and (vii) travel impedance functions, free flow speeds, and link capacities were manually adjusted many times and could impact the capacity-related performance characteristics of each link.

The mode split of the freight transport model also had two simplifications that could be a source of error: (i) it was made by using proportional coefficients, which represents the mode share of freight tonne-km moved by the last freight transport matrix developed to New Zealand; (ii) some sectors had to be combined due to statistical data limitations.

Regarding the analysis of the impacts of fuel constraints on the economy, some shortfalls of the model appeared. One is that traditional I-O models can only analyse the reduction of financial flows imposed on the economy by the constraint. Also, the priced input-output models and quantity models were individually applied. Also, during this process, some assumptions regarding the price elasticity of fuel and considerations on the price increase that the constraint imposed had to be made. In addition, the social issues that a considerable price increase may cause were not taken into consideration; these include the ability of the poorest people to purchase fuel, even if they need, and a possible regulation of the market by the government (including the implementation of rationing plans).

6.4. Recommendations for Future Research

Even with the considerable knowledge development and outcomes generated with this research, further research is required and some recommendations for future research are as follows.

• **Future Scenarios Analysis**: To be able to support decision-making and planners to justify and evaluate investment options and identify the impacts of fuel constraints, there is a need to include a long term analysis. This would include the creation of different scenarios of fuel use and fuel constraint, using a wide-range of economic, transportation and technological considerations. Also, different mitigation options should be analysed, evaluating their possible associated performances. Part of this analysis was made in two different papers (Lang and Dantas, 2010, Lang *et al.*, 2010). Mitigation options could be implemented at all economy levels to reduce fuel consumption and may include: reduction of vehicle speed, increasing loading rates and space utilisation, reducing empty-running, better vehicle routing, changing delivery times, changing the supplier of the products to more local producers, using alternative fuels, information technology, using more efficient vehicles (engine), enhancing vehicle technology (aerodynamics, tires, lubricants, etc), improving driver behaviour (through training and monitoring programs), using vehicles with greater capacity (fewer vans and small trucks), changing the land-use, adopting superior logistical trends (such as reverse logistics, rationalization of the supply chain, etc). One interesting approach to study would be investigate a series of supply constraints, or a series of fuel price increases, and estimate the cumulative effects on the economy and freight transport. One way to this is to use the 'end-condition' for one supply constraint (or price increase) as the 'start-condition' for the next supply constraint (or price increase), as suggested by Lang and Dantas (2010). Another option would be to use a dynamic input-output to project economic growth or decline and structural changes and at the same time apply the supply constrained input-output model.

- **Risk Analysis**: The economic impact method and the freight transport model could be integrated to perform a risk analysis, combining probability curves of fuel constraints. It would be of great value to assign risk values for each planning scenario. This analysis would help in the identification of the strengths and weaknesses of the method as a whole, and would produce information to assess the development of new strategies and policies at a strategic level. The combined analysis of impacts and probability of occurrence of a certain event could enhance New Zealand's resilience and reduce the risks of fuel constraints to freight transport and the economy.

- **Use of other economic models**: Other economic models could be tested. For instance, one alternative to the economic analysis would be to use a life cycle cost analysis (LCCA), which is an engineering economic evaluation technique for evaluating various programs, designs, alternative courses of actions or projects over a period of time with the objective to choose the best way to employ scarce resources (Durairaj *et al.*, 2002, Sinha and Labi, 2011). Also, the combination of LCCA with I-O analysis (called hybrid LCC) could be used, but it is a very new area of development and needs to be investigated and developed, but it looks promising and challenging (Nakamura and Kondo, 2006). Another option would be to use CGE models, which tend to be highly non-linear and can result in the need for complex solution algorithms. Most CGE models are static. When solving for a long-term equilibrium solution, capital stocks are normally assumed to be fixed in the short-term, but by selecting an appropriate stock adjustment function, they can be updated from period to period (West and Jackson, 1998). The main advantage of a CGE model is that both supply and demand are explicitly determined with full price response. However, the implementation necessitates the specification of a large number of parameters and coefficients, which are generally not available and have to be 'guessed', and this can have a significant effect on the results. On the hand, another advantage of the model is that it is already widely used with spatial analysis, giving a consolidated economic and freight analysis tool (Friesz *et al.*, 1998). An alternative is also to use a dynamic input-output model, to investigate the penetration of new technologies. It includes the stocks and flows of capital goods explicitly and the "planned capacity per sector depends on the developments in the production of that sector in previous period" (Idenburg and Wilting, 2000).

• **Use of other transport models**: The movement of goods in space and time is by nature dynamic, and static transport models cannot represent it completely accurately. Decisions on the demand side are made in a dynamic context of reaching and scheduling activities at desirable starting times (Flügel et al., 2014). However, it is observed that dynamic models are more suitable to urban models and static models are more commonly used for strategic and macroscopic transport models. A good dynamic and disaggregated model is the activity-based demand model, but there are many dynamic traffic assignment (DTA) models that could be used.

• **Climate Change and Sustainability Planning**: Climate change, sustainability and peak oil are close related issues, with a common target to reduce the consumption of fossil fuels. When addressing the problem of peak oil we would also be addressing climate change issues. Thus, the impacts of climate change on the economy and on the freight transport sector could be analysed using the same framework. Also, a more rational discussion on sustainability actions and plans could be of great value, as many times these topics are treated with a utopian point of view, not giving sufficiently specific quantitative results. On the other hand, sustainability and climate change are more widely discussed and accepted in society and move forward international agreements, such as Rio+20 discussions. Peak oil does not have the same solid understanding and there is still a need to create and increase the social awareness of the problem and the consequences of all aspects (social, economic, environmental and political). The attempt to enhance the understanding and consciousness of peak oil could be treated together with the systematical analysis of mitigation options, as changing attitudes and technology are the missing pieces of this puzzle.

Finally, it is necessary to develop a plan or strategy for reducing energy consumption by freight transport in the short and long term, and by the entire economic system, as demand-side management[48] has been previously and efficiently applied in the electricity sector.

[48] Demand-side management is a set of techniques and actions taken to influence customer use of electricity. It can be a helpful tool to avoid inefficiency and encourage users to explore customer consumption, especially for energy restriction scenarios. It is a very well established and systematic technique which can return very good results.

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APPENDIX A – NATIONAL I-O DATA

A.1. 2006 Original I-O Table

Table A.1: Original 2006 I-O table (Million NZD)

Industries		1 HFRG	2 SBLC	3 DAIF	4 OTHF	5 SAHF	6 FOLO	7 FISH	8 COAL	9 FUEL	10 OMIN	11 MEAT	12 DAIR	13 OFOD	14 BEVT	15 TCFL	16 WOOD	17 PAPR	18 PPRM	19 CHEM	20 RBPL	21 NMMP	22 BASM	23 FABM	24 MAEQ	25 OMFG	26 ELEC	27 WATS	28 WAST	29 CONS	30 TRDE	31 ACCR
1	HFRG	34.3	64.0	130.7	7.2	22.6	17.8	0.1	0.0	0.1	0.0	113.4	0.0	159.4	138.1	2.0	0.2	0.1	0.1	0.1	0.8	0.1	0.0	0.1	0.3	0.0	0.0	0.0	0.0	4.4	120.4	134.1
2	SBLC	45.6	900.1	249.8	57.3	43.2	17.8	0.0	0.0	0.0	0.0	3065.0	0.0	90.6	40.4	113.8	1.0	0.2	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	508.5	15.4
3	DAIF	8.9	64.9	38.9	6.5	7.2	1.1	0.0	0.0	0.0	0.0	0.0	4470.4	11.2	9.5	3.2	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	21.6	3.7
4	OTHF	37.5	93.4	51.6	57.0	31.0	2.7	0.1	0.0	0.0	0.0	372.1	43.3	34.6	10.2	6.4	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.8	26.7	7.3
5	SAHF	204.0	341.9	163.0	44.3	146.2	197.7	0.9	0.2	0.3	0.3	205.5	0.0	12.8	3.9	2.1	2.5	0.8	0.5	3.6	1.8	1.5	0.6	0.7	3.4	0.3	0.7	0.4	0.0	10.1	41.9	0.9
6	FOLO	8.3	25.3	31.4	4.0	1.3	537.0	0.8	0.5	0.1	0.8	35.0	0.0	1.2	4.6	3.1	882.4	126.5	2.2	2.6	0.6	0.9	0.5	2.1	4.6	3.6	0.9	0.0	0.0	55.2	127.1	0.2
7	FISH	0.2	0.2	0.3	0.0	0.8	0.5	109.5	0.2	0.4	0.3	0.1	0.0	517.2	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.1	1.0	0.2	0.0	0.0	0.5	37.4	1.1
8	COAL	0.0	0.0	5.5	0.0	0.0	0.0	0.0	0.9	5.5	5.2	2.8	16.8	7.6	0.8	1.6	4.8	1.9	0.3	0.0	1.4	14.1	83.2	0.0	0.0	0.0	79.5	0.0	0.0	0.0	4.3	0.2
9	FUEL	16.8	79.0	52.5	29.7	68.8	93.6	33.6	74.0	2298.1	89.4	37.2	77.8	84.9	25.4	34.9	66.6	56.7	163.2	267.4	45.6	38.0	25.1	45.7	78.6	31.2	556.5	0.0	9.6	437.1	415.6	20.9
10	OMIN	6.9	23.6	22.3	4.0	0.7	1.2	0.4	23.8	71.5	55.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	12.5	127.3	53.6	14.8	2.2	7.4	0.0	0.0	3.5	116.8	11.2	0.0
11	MEAT	3.3	12.6	38.5	9.7	2.0	0.6	2.6	2.2	0.1	3.7	329.8	0.0	29.1	0.0	160.9	0.0	0.0	33.1	0.0	48.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.5	301.3
12	DAIR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5	0.0	0.0	742.2	29.1	17.0	0.0	65.5	16.8	8.3	6.8	26.2	10.7	1.0	10.2	32.2	15.8	0.3	0.0	0.0	1.0	818.4	200.9
13	OFOD	9.2	43.2	121.5	29.6	7.2	2.1	49.3	0.6	0.8	0.9	49.7	62.6	1117.9	104.3	3.6	10.6	5.5	13.2	2.9	16.2	2.3	0.9	5.3	9.1	3.4	0.4	0.4	0.1	3.3	203.8	351.7
14	BEVT	1.3	0.8	0.5	0.4	0.3	0.4	0.1	0.0	0.1	0.0	0.6	0.7	12.9	164.3	0.7	1.1	0.4	2.5	0.3	1.3	0.5	0.3	1.1	2.2	0.6	0.1	0.0	0.0	1.0	83.1	819.5
15	TCFL	2.2	1.7	6.1	0.4	4.0	4.1	1.6	0.0	0.6	0.0	1.5	1.9	5.9	4.5	193.1	11.8	2.8	23.9	0.4	4.4	1.4	2.7	6.8	14.4	12.1	0.2	0.1	0.0	93.5	250.6	0.6
16	WOOD	0.8	2.2	2.1	0.5	0.1	10.9	0.1	0.1	0.3	0.2	0.6	0.8	0.8	6.3	1.0	492.0	40.7	7.6	0.2	4.7	29.8	2.7	12.5	12.6	231.6	0.2	0.0	0.0	1803.7	54.2	0.3
17	PAPR	51.7	3.8	2.7	4.4	1.8	2.4	0.2	0.7	1.1	1.1	4.3	5.4	10.2	23.8	1.5	30.2	414.0	195.5	2.6	53.8	13.9	2.2	1.7	11.1	10.3	18.9	0.3	0.1	58.7	177.7	5.1
18	PPRM	4.3	10.5	2.9	4.3	11.8	4.3	0.7	0.3	7.8	0.6	23.6	29.7	65.8	40.9	16.2	31.8	52.2	256.1	7.9	51.2	16.0	5.5	37.1	52.6	21.5	16.8	0.0	2.0	95.1	775.5	33.2
19	CHEM	59.4	195.4	217.3	31.9	37.0	31.8	1.2	1.0	13.2	1.6	14.8	17.9	14.4	4.0	4.4	78.1	43.8	7.7	334.7	260.5	7.9	4.4	29.4	34.8	11.2	3.1	1.8	0.4	33.5	108.5	1.7
20	RBPL	55.1	68.8	83.2	22.6	8.9	19.7	1.8	1.0	7.1	1.7	123.0	154.9	181.9	17.8	11.7	49.1	18.1	69.9	21.3	318.5	7.0	4.6	49.6	94.8	30.1	1.3	1.8	1.6	377.1	357.4	21.4
21	NMMP	2.3	6.4	6.5	1.3	0.9	1.2	0.2	3.3	17.7	5.5	0.5	0.7	5.0	42.0	0.3	3.6	0.6	2.4	0.3	3.8	323.5	5.6	25.5	105.2	7.4	0.1	3.9	2.0	1368.7	57.2	1.2
22	BASM	0.7	2.5	1.6	0.4	5.1	14.2	0.1	0.9	9.4	1.4	22.6	28.4	19.0	9.2	7.2	29.9	26.9	17.7	12.2	21.8	32.3	237.6	480.3	322.6	61.9	2.3	4.5	0.6	96.8	410.7	15.1
23	FABM	14.8	38.4	35.9	7.7	9.0	21.2	6.0	2.3	11.9	3.8	35.4	44.6	67.1	170.4	15.3	42.7	34.9	16.7	17.2	58.6	34.9	154.9	847.8	703.8	70.9	18.6	2.3	3.5	650.4	447.1	36.0
24	MAEQ	7.3	20.9	25.3	4.0	39.6	7.2	40.3	1.1	51.4	1.9	7.4	9.3	14.7	13.7	7.1	7.5	8.1	13.0	7.8	10.0	5.0	16.1	38.3	416.5	7.0	62.8	0.9	2.3	530.6	280.7	18.6
25	OMFG	1.1	2.7	2.9	0.6	0.5	3.6	0.1	0.3	0.5	0.5	1.4	1.8	3.9	12.8	1.4	4.6	2.0	6.6	0.6	5.9	2.7	5.9	21.2	37.4	85.6	0.6	2.7	0.2	198.5	76.1	23.4
26	ELEC	87.3	46.4	87.2	25.6	4.7	10.0	7.0	6.7	45.6	33.8	127.3	115.9	89.2	21.5	21.6	118.3	266.1	31.3	49.8	56.9	62.3	343.8	44.1	63.4	18.4	5253.5	47.7	2.8	92.6	488.4	149.6
27	WATS	0.0	0.0	0.0	0.0	5.5	0.1	3.1	0.2	1.1	0.3	37.2	19.2	4.3	11.4	1.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	2.3	302.3	0.1	4.4	46.9	2.6
28	WAST	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	9.7	20.7	10.5	0.1	1.2	28.0	0.1	3.1	4.6	2.0	0.1	0.7	0.2	11.7	1.4	1.0	1.5	184.9	65.1	3.0	0.5
29	CONS	19.3	52.4	50.0	11.1	4.4	19.4	6.3	41.0	148.5	67.3	2.1	2.7	3.2	6.1	4.8	13.2	15.4	2.7	1.3	4.9	45.3	2.5	18.1	167.8	5.1	504.2	0.1	9.8	7876.8	73.6	1.9
30	TRDE	151.1	401.3	426.5	85.7	137.7	122.2	51.9	15.7	61.7	25.9	200.5	252.4	501.7	196.1	192.4	159.1	151.0	132.8	81.7	76.9	53.7	178.5	209.2	532.2	77.4	73.0	0.0	22.3	1828.3	2986.6	478.9
31	ACCR	1.9	3.0	2.4	0.9	2.2	2.0	0.1	0.4	1.6	0.6	1.2	1.5	2.3	1.4	1.3	1.5	0.6	2.0	0.8	2.6	1.0	0.6	2.5	5.3	1.2	2.0	0.0	0.4	29.1	55.6	8.1
32	RDFR	52.9	78.7	28.2	25.6	27.3	337.0	9.8	8.6	12.1	14.1	160.2	281.4	213.5	50.6	32.6	138.9	53.5	57.5	129.5	77.6	86.9	89.1	56.1	87.3	32.5	3.2	1.2	5.4	108.8	953.7	1.8
33	RDPS	0.4	0.8	0.5	0.4	0.5	0.4	0.2	0.0	0.0	0.1	0.5	0.6	0.6	0.3	0.1	0.3	0.2	0.3	0.3	0.4	0.4	0.1	0.2	0.9	0.2	0.5	0.0	0.1	6.2	7.4	2.1
34	RFRT	3.3	6.7	3.4	1.9	0.0	22.8	0.0	36.6	0.0	14.5	32.6	20.5	20.8	6.4	6.8	13.5	24.8	11.3	24.7	15.2	10.5	10.6	12.4	14.2	6.6	0.0	0.0	0.0	5.2	22.2	0.0
35	WFRT	0.0	0.0	0.0	0.0	0.0	6.8	2.7	3.8	53.6	26.4	43.8	0.0	11.6	5.7	0.0	12.1	33.3	0.0	5.5	0.0	32.9	9.5	2.8	3.2	0.0	0.0	1.7	2.3	4.6	0.0	12.1
36	OFRT	1.2	1.6	0.8	0.7	1.6	5.4	3.2	0.3	1.7	0.0	10.6	2.2	11.4	1.5	1.6	4.8	7.3	2.7	3.7	3.7	0.6	1.7	1.8	6.3	1.6	0.9	0.0	0.0	4.9	83.9	0.0
37	OTTR	9.5	13.1	6.6	5.3	12.7	45.0	25.5	4.6	22.6	5.4	92.8	18.6	93.1	13.3	13.2	40.7	65.1	22.0	31.2	29.6	11.3	15.5	15.6	50.9	12.8	7.3	0.3	0.4	39.7	663.3	2.1
38	COMM	39.8	61.0	28.4	32.6	18.4	24.7	6.2	2.9	9.9	4.8	25.8	32.5	41.2	17.5	13.8	27.5	18.2	50.7	17.8	45.9	19.7	11.3	35.5	85.6	15.8	31.2	0.1	5.2	259.7	739.2	31.5
39	FIIN	143.1	162.9	67.1	52.0	75.0	80.4	59.7	4.2	34.3	6.8	47.1	59.3	100.8	111.1	30.3	75.1	33.2	68.8	32.6	67.6	31.4	115.9	63.0	109.3	28.4	120.1	2.6	5.8	277.8	1728.2	94.5
40	HOUS	33.4	60.0	65.0	2.8	9.6	8.5	1.5	0.7	5.5	1.1	20.9	26.3	28.7	11.3	18.3	18.9	4.7	28.4	7.7	27.7	10.8	6.0	41.6	56.8	21.2	64.9	0.0	2.6	165.0	1044.6	59.4
41	EHOP	25.7	24.3	14.1	5.6	16.3	22.5	17.6	4.7	5.4	7.8	11.3	14.2	30.0	4.7	4.1	18.9	5.5	18.0	12.7	11.6	6.3	4.6	11.6	27.5	5.7	29.0	3.4	4.8	53.1	152.0	9.6
42	SRCS	30.4	46.0	21.7	6.6	31.8	29.0	13.1	4.1	111.0	6.7	60.2	75.9	54.0	59.2	10.9	20.7	71.5	35.8	36.4	44.3	30.7	32.9	60.7	163.5	12.6	635.1	2.7	1.9	324.0	653.0	25.7
43	OBUS	108.0	186.1	85.9	83.5	51.2	133.6	29.1	6.4	50.5	10.4	117.5	147.9	252.7	196.1	70.6	130.8	47.6	160.4	52.3	186.7	77.9	35.7	128.2	262.4	60.4	201.1	9.8	11.5	881.4	2920.9	190.7
44	GOVC	7.5	25.2	14.3	3.7	2.3	6.9	2.2	0.4	0.9	0.6	1.9	2.4	3.6	1.5	1.5	18.6	2.9	2.9	1.0	2.6	3.7	0.8	3.5	5.4	4.3	3.4	0.1	0.8	29.3	80.3	5.8
45	GOVL	0.1	0.2	0.1	0.1	0.2	0.6	0.0	4.9	0.1	8.0	0.6	0.8	0.9	0.5	0.4	1.1	0.2	0.7	0.3	0.4	17.3	0.1	0.4	1.2	0.1	0.0	0.0	4.5	5.0	4.3	0.2
46	SCHL	0.9	2.0	1.5	0.5	0.4	0.9	0.1	0.1	0.6	0.2	0.5	0.6	1.2	0.7	0.7	4.3	0.4	6.0	0.2	1.4	0.3	0.2	2.4	2.2	0.5	5.7	0.0	0.1	5.2	13.8	1.1
47	OEDU	1.8	1.5	0.5	1.3	1.3	4.0	0.3	0.1	1.1	0.1	1.1	1.4	2.3	1.7	0.6	23.5	0.4	1.4	0.6	4.9	0.7	0.2	1.6	3.3	0.5	23.6	0.1	0.1	32.2	31.9	2.1
48	HOSP	0.3	0.5	0.6	0.0	0.2	1.1	0.1	0.0	0.1	0.0	0.2	0.3	0.3	0.1	0.2	0.2	0.2	0.3	0.2	0.8	0.3	0.1	0.4	0.8	0.2	0.6	0.0	0.0	2.4	8.9	0.5
49	OHCS	2.5	17.8	33.4	1.6	2.0	0.7	0.2	0.0	0.2	0.1	0.9	1.1	0.8	2.4	0.3	2.0	2.7	2.1	0.2	1.3	1.9	0.3	1.6	2.8	0.2	2.2	0.0	0.1	5.9	17.8	0.7
50	CULT	13.6	23.8	11.5	6.5	11.0	2.6	0.2	0.2	1.8	0.4	18.7	23.5	41.0	23.3	6.4	10.2	3.9	45.0	4.6	37.0	13.9	2.6	10.0	28.6	6.6	10.4	0.1	0.6	30.5	381.4	24.1
51	PERS	1.5	2.6	4.8	0.6	7.2	9.0	3.5	0.1	0.9	0.2	47.4	59.6	10.3	8.8	9.0	1.4	0.5	20.5	1.9	5.1	1.4	0.5	7.3	10.3	1.2	23.9	0.0	0.2	42.5	73.8	3.2
Other Imports		163.4	409.6	424.3	93.9	113.9	156.2	131.6	3.8	0.0	13.5	310.1	214.3	780.6	357.4	340.7	195.1	270.4	644.1	675.4	1110.8	192.4	250.4	772.0	1716.5	261.7	148.0	13.4	13.5	2577.2	2615.0	372.9
Compensation of Employees		749.7	1472.8	1123.0	180.5	663.4	448.3	104.5	37.0	175.0	127.2	1210.8	466.2	1071.1	382.1	515.4	784.1	389.9	980.5	247.0	756.8	434.6	422.2	1027.9	2087.1	423.4	441.6	69.4	135.3	4345.0	10145.3	1755.2
Depreciation + Op Surplus		375.6	271.7	770.0	82.1	184.2	464.9	123.2	132.6	1748.8	180.6	189.5	1492.7	903.4	642.5	216.0	503.1	574.0	620.4	542.4	534.1	456.9	1097.7	652.1	1231.0	305.1	2772.6	338.9	178.5	3911.2	6605.3	1052.4
Net Indirect Taxes		55.8	216.5	155.3	32.7	9.2	19.7	-0.8	19.4	1163.8	13.1	10.3	51.7	34.0	1510.7	5.5	20.2	20.9	30.8	16.8	34.7	35.7	15.7	34.8	25.9	10.9	53.2	3.6	7.8	352.8	473.3	150.7
Adjustment		0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gross Output		**2656.2**	**5590.9**	**4720.4**	**1071.8**	**1844.5**	**2978.1**	**851.5**	**452.9**	**6162.0**	**744.2**	**7239.7**	**9115.8**	**6816.1**	**4510.0**	**2113.3**	**4202.6**	**2917.5**	**3823.3**	**2675.0**	**4092.5**	**2310.8**	**3257.3**	**4848.1**	**8703.5**	**1928.9**	**11178.2**	**818.1**	**627.7**	**29305.1**	**38500.1**	**6453.6**

Table A.1: Original 2006 I-O table (Million NZD) - right hand side

32 RDFR	33 RDPS	34 RFRT	35 WFRT	36 OFRT	37 OTTR	38 COMM	39 FIIN	40 HOUS	41 EHOP	42 SRCS	43 OBUS	44 GOVC	45 GOVL	46 SCHL	47 OEDU	48 HOSP	49 OHCS	50 CULT	51 PERS	Private Consumption	Government Consumption	Stock Change	Gross Investment	Exports	Import Adjustments	Final Demand	Gross Output
0.1	0.0	0.0	0.1	0.1	0.7	0.1	1.3	9.9	1.7	2.7	5.2	3.1	0.1	0.2	0.4	39.2	1.3	2.9	0.5	383.7	0.0	-3.6	9.2	1247.1	0.0	1636.4	**2656.2**
0.8	0.0	0.1	0.1	0.2	1.7	0.0	0.4	3.6	4.5	3.0	1.4	2.6	0.0	0.1	0.2	3.3	0.9	16.8	0.2	58.0	0.0	1.0	4.2	336.0	0.0	399.3	**5590.9**
0.1	0.0	0.0	0.0	0.0	0.3	0.0	0.1	4.1	0.6	0.2	0.3	0.8	0.0	0.1	0.1	1.2	0.3	1.9	0.1	14.7	0.0	0.3	4.4	42.9	0.0	62.3	**4720.4**
0.2	0.0	0.1	0.1	0.1	0.8	0.0	0.7	5.0	5.6	0.4	1.1	3.6	0.0	0.1	0.2	4.2	1.6	9.3	0.4	140.0	0.0	0.5	5.1	117.7	0.0	263.3	**1071.8**
6.1	0.2	0.8	0.9	1.4	11.4	0.3	2.7	0.9	11.2	1.1	118.4	23.0	1.3	0.2	1.3	0.4	10.7	25.1	2.3	21.3	10.8	0.3	186.4	13.1	0.0	231.9	**1844.5**
10.2	0.3	0.3	0.4	0.6	4.6	0.6	1.6	1.9	1.4	1.7	178.7	1.2	1.4	1.9	0.7	0.3	0.5	1.1	0.7	51.5	0.0	96.0	36.7	721.1	0.0	905.4	**2978.1**
0.3	0.1	0.2	0.2	0.4	3.1	0.0	9.3	1.3	1.7	0.3	0.5	0.3	0.3	0.1	0.1	0.3	0.2	0.2	0.1	1.8	0.0	5.4	0.5	154.1	0.0	161.8	**851.5**
0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	8.6	3.8	5.2	11.3	0.7	0.6	0.4	11.4	0.0	0.0	23.2	150.3	0.0	184.9	**452.9**
185.3	35.2	11.0	74.3	45.0	368.6	11.4	9.3	17.5	9.0	38.6	28.5	114.4	44.1	10.5	20.8	30.5	45.3	11.0	10.8	1426.2	0.0	-27.7	1000.5	530.3	-3242.1	-312.8	**6162.0**
5.4	0.0	4.4	0.0	0.0	0.2	0.2	0.5	1.5	0.2	1.1	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	0.0	0.0	19.3	151.4	-7.4	167.8	**744.2**
0.0	0.0	0.0	0.0	0.1	0.9	0.0	0.0	0.0	0.0	0.0	0.0	7.7	0.0	1.1	4.6	4.9	0.3	7.5	0.3	2008.0	0.0	0.0	7.1	4208.7	-0.1	6223.8	**7239.7**
1.2	0.0	0.0	0.0	0.1	0.9	0.2	2.2	4.0	0.8	9.8	11.0	0.0	2.5	1.1	4.6	4.9	0.3	0.0	0.3	1081.7	0.0	-175.8	9.5	6148.8	0.0	7064.2	**9115.8**
0.3	0.1	0.1	0.1	0.2	1.4	0.4	4.6	1.1	2.3	1.8	5.1	3.4	0.6	0.6	2.5	53.1	4.0	22.3	0.6	2255.7	8.3	-5.8	21.5	2200.2	-0.1	4479.9	**6816.1**
0.3	0.2	0.0	0.1	0.1	0.7	0.2	1.9	0.3	0.2	0.4	7.6	1.1	0.0	0.1	1.6	0.7	0.5	38.1	0.2	2519.1	0.0	10.3	2.8	826.6	0.0	3358.7	**4510.0**
1.0	0.5	0.1	0.1	0.2	1.3	0.2	0.7	72.8	0.7	1.4	9.3	17.0	1.6	4.8	7.0	3.7	1.9	11.3	0.3	378.7	0.0	12.9	7.3	925.3	-0.2	1323.9	**2113.3**
0.2	0.0	0.1	0.1	0.2	1.6	0.2	0.3	21.6	0.1	60.7	4.5	2.4	0.3	4.1	4.1	1.9	0.3	1.5	14.7	32.4	0.0	-25.8	30.2	1327.4	0.0	1364.1	**4202.6**
3.2	1.6	0.9	1.1	1.6	13.0	0.7	5.4	93.5	0.4	23.8	194.8	1.4	0.8	2.8	4.2	2.5	10.9	0.6	0.4	279.2	0.1	-1.5	2.3	1162.6	-0.2	1442.3	**2917.5**
12.8	4.5	3.6	4.4	6.8	54.4	82.0	134.3	47.1	25.1	99.0	529.8	73.9	7.4	38.1	43.7	19.8	51.9	91.0	79.3	435.3	0.0	6.3	21.0	274.8	-1.1	736.2	**3823.3**
10.0	1.7	1.2	1.5	2.3	18.7	0.5	0.8	2.1	2.3	2.0	8.3	3.9	1.9	2.5	2.7	14.4	13.3	2.4	6.7	85.4	0.0	-6.7	5.5	887.9	-3.3	968.7	**2675.0**
0.4	2.9	0.4	0.4	0.7	5.3	4.1	5.3	40.4	5.0	14.5	74.4	15.1	4.9	5.8	10.3	48.7	46.9	5.7	29.6	493.5	96.7	1.4	87.1	913.9	-3.2	1589.4	**4092.5**
8.5	3.0	0.1	0.1	0.2	1.5	2.3	1.0	19.3	15.3	46.0	3.0	0.7	0.3	3.4	1.6	0.2	2.2	0.2	2.7	44.0	0.0	0.2	24.9	128.5	-3.4	194.2	**2310.8**
0.7	0.4	0.2	0.2	0.3	2.4	0.5	11.8	2.3	1.0	45.3	16.0	1.3	0.6	5.7	2.7	0.6	3.5	5.0	0.5	24.6	0.0	0.7	34.8	1201.4	-1.0	1260.4	**3257.3**
2.3	1.1	1.9	2.4	3.6	29.2	6.9	16.0	143.2	10.2	29.6	13.9	30.5	10.4	8.0	9.9	6.1	1.5	6.1	1.0	110.3	0.0	18.6	211.9	551.9	-2.4	890.3	**4848.1**
15.3	12.1	12.7	15.6	24.0	192.5	102.5	6.9	21.1	32.1	37.0	55.2	95.6	49.4	26.1	59.0	50.8	7.3	48.9	12.9	740.4	3.4	31.0	2037.4	3373.4	-35.4	6150.2	**8703.5**
0.3	0.5	0.1	0.1	0.1	1.2	0.5	1.4	106.6	4.2	2.4	4.2	4.8	5.7	5.7	3.2	1.5	1.9	3.8	8.0	427.6	0.0	18.9	424.2	393.9	-0.1	1264.5	**1928.9**
6.6	3.3	10.5	0.7	7.1	56.6	51.4	38.3	6.8	10.7	63.8	80.1	90.8	106.5	55.5	125.8	45.4	63.4	75.1	21.3	2137.5	0.0	0.0	243.1	59.0	0.0	2439.7	**11178.2**
0.0	0.0	0.2	0.2	0.3	2.5	0.0	0.0	293.8	0.0	0.4	0.0	2.6	50.3	0.0	0.0	1.6	2.5	0.1	0.0	1.3	0.0	0.0	17.7	0.5	0.0	19.5	**818.1**
0.5	0.0	0.1	0.1	0.1	0.8	0.4	16.7	2.9	0.2	0.3	7.5	40.1	84.3	7.7	3.4	17.6	35.9	0.5	46.8	10.1	0.0	0.0	1.1	0.1	0.0	11.3	**627.7**
9.5	6.5	3.0	3.7	5.7	45.6	71.7	51.5	1440.7	9.0	27.1	21.6	384.3	716.1	35.9	154.1	37.2	106.5	126.0	61.7	179.4	6.0	3.6	16409.0	208.7	-0.2	16806.6	**29305.1**
407.7	117.7	17.8	24.0	34.7	279.1	156.1	179.3	456.4	134.2	128.7	500.0	277.2	58.7	106.5	99.0	253.4	155.8	87.4	7.0	16275.1	530.1	488.3	3846.0	4017.5	-2.1	25154.8	**38500.1**
3.0	0.6	2.6	3.2	5.0	40.0	1.8	10.7	3.0	2.6	13.4	20.4	123.8	7.6	37.0	41.9	24.2	67.9	25.1	14.6	3754.6	0.0	2.7	8.9	2102.8	0.0	5869.0	**6453.6**
1062.2	5.7	7.4	9.0	13.9	111.3	37.9	13.9	2.7	20.7	16.6	66.6	29.3	14.6	4.5	7.6	3.3	11.3	27.1	27.2	154.8	31.2	0.0	20.0	83.8	0.0	289.7	**4998.2**
9.1	7.7	0.6	0.7	1.0	8.4	0.6	7.3	0.2	2.0	15.7	18.7	11.2	0.4	20.3	16.0	4.6	16.8	14.8	12.1	306.3	164.5	0.3	5.1	134.2	0.0	610.4	**803.7**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	147.6	0.0	0.0	8.4	0.0	0.0	156.0	**503.5**
113.0	19.9	70.9	0.0	1.3	14.3	22.3	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	68.7	0.0	0.0	24.8	0.0	0.0	93.5	**615.4**
9.3	0.0	2.3	4.3	19.2	152.3	6.9	6.9	1.0	4.6	13.3	24.5	15.2	1.7	0.7	3.5	1.1	2.1	7.6	3.0	106.1	2.4	0.3	11.1	380.9	-0.9	499.8	**946.9**
93.6	3.5	31.0	33.6	151.6	1203.8	58.2	55.7	7.7	36.5	104.7	193.3	119.7	13.2	5.7	27.4	8.5	16.3	59.8	23.8	856.6	19.2	2.2	92.3	3004.5	-7.0	3967.8	**7604.7**
203.7	16.5	6.6	8.1	12.4	99.6	1275.4	250.1	33.6	34.9	206.1	352.3	233.0	71.0	23.3	99.4	45.6	94.3	175.9	76.5	2047.8	0.0	-0.8	196.9	594.8	-0.4	2838.3	**7911.0**
100.4	31.0	27.1	33.1	51.0	409.4	104.7	4108.6	930.6	205.2	271.8	665.6	411.2	88.4	30.4	115.4	97.8	250.4	325.4	232.2	2988.7	29.7	0.5	221.3	498.6	-1.2	3737.5	**16115.8**
43.9	7.2	5.8	7.1	11.0	88.1	50.3	192.0	1320.9	42.3	112.0	259.3	298.6	14.9	10.8	39.9	18.5	160.9	207.3	60.3	17036.0	364.4	0.0	1088.0	199.3	0.0	18687.7	**23492.6**
52.5	20.5	34.1	41.7	64.2	515.8	15.2	53.1	29.2	173.3	77.8	105.0	89.0	74.3	3.3	29.7	27.0	43.1	57.2	32.9	135.9	0.4	1.3	45.8	333.5	-0.7	516.3	**2637.5**
5.6	7.1	5.8	7.1	10.9	87.4	99.1	539.7	13.1	36.7	1027.0	401.2	338.0	193.2	10.8	21.4	70.5	103.7	200.6	63.0	146.1	413.6	2.4	1429.6	389.4	-3.6	2377.5	**8331.5**
94.1	34.9	20.4	25.0	38.4	308.8	371.0	873.0	245.9	194.4	591.7	1800.4	772.7	195.4	109.2	250.8	197.7	411.4	653.5	422.5	485.0	187.7	0.4	307.3	724.2	-3.4	1701.3	**16200.0**
8.5	1.5	0.7	0.9	1.3	10.7	5.0	39.9	21.8	5.2	16.5	26.1	52.9	3.6	19.3	5.0	14.2	29.9	15.2	11.4	223.1	8520.0	-0.3	64.2	86.9	0.0	8893.9	**9423.8**
3.6	0.1	0.1	0.1	0.1	1.1	0.6	3.8	2.7	1.2	5.7	23.3	5.9	36.7	24.8	2.4	2.9	5.5	104.0	5.0	174.0	3499.2	0.0	16.2	63.8	0.0	3753.2	**4035.9**
0.8	0.4	0.4	0.5	0.7	5.8	2.9	3.7	4.1	1.3	5.5	10.2	14.4	4.1	13.3	18.0	5.7	5.4	13.9	11.0	139.2	3560.4	0.2	4.0	86.8	0.0	3790.7	**3967.7**
1.4	1.2	0.6	0.8	1.2	9.3	15.5	14.5	6.9	4.9	38.8	127.8	84.3	2.8	29.0	149.1	14.2	60.9	10.2	90.7	1122.9	1647.1	0.5	37.1	643.7	0.0	3451.2	**4261.6**
2.7	0.1	0.2	0.2	0.3	2.6	1.1	2.2	0.6	0.6	13.6	6.5	46.8	0.4	0.4	3.6	6.6	21.9	1.7	2.7	550.8	4906.0	0.0	11.2	19.3	0.0	5487.3	**5622.1**
1.9	0.7	0.5	0.6	0.9	7.6	1.1	12.4	4.3	3.8	11.1	14.7	60.7	13.8	11.1	9.6	143.4	598.9	34.5	4.9	2501.1	3300.7	0.3	23.3	61.9	0.0	5887.3	**6929.9**
5.3	2.0	2.6	3.2	4.9	39.3	100.9	47.6	14.9	21.2	35.6	607.6	47.2	77.0	58.6	22.8	5.3	21.1	969.9	43.4	3859.0	289.9	0.7	42.1	711.3	0.0	4903.0	**7827.2**
18.2	1.1	0.4	0.5	0.8	6.2	5.2	17.9	56.6	3.6	20.3	116.5	42.2	99.8	23.1	21.2	43.5	43.8	57.2	187.3	2602.5	85.4	0.6	13.8	109.8	0.0	2812.0	**3936.6**
142.9	88.3	49.6	60.8	92.7	744.5	611.0	271.4	333.0	202.3	426.0	979.8	425.8	83.5	115.2	183.8	380.4	302.0	560.6	224.7	14019.3	312.2	235.6	7961.6	0.0	3319.7	25848.4	**47468.9**
1045.4	279.9	119.8	132.1	197.6	1588.7	1294.1	3590.2	662.3	293.7	3181.8	4815.2	4347.2	1154.6	2795.0	2318.7	3561.8	2525.3	1545.8	1499.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**70120.6**
751.9	182.3	67.8	111.7	117.8	952.6	3264.0	4349.4	14240.7	982.1	1438.9	3622.4	529.5	702.2	271.5	266.6	280.4	1548.3	1834.6	535.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**65203.4**
535.8	-100.2	-23.8	0.0	12.4	96.2	72.7	1141.6	2735.4	74.6	44.2	61.0	121.7	24.3	18.2	34.9	5.8	16.3	322.7	43.3	8531.6	671.4	1.5	952.1	785.4	0.0	10942.0	**20764.0**
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01	-0.01	-0.01	-0.01	0.00	0.0	**0.0**
4998.2	**803.7**	**503.5**	**615.4**	**946.9**	**7604.7**	**7911.0**	**16115.8**	**23492.6**	**2637.5**	**8331.5**	**16200.0**	**9423.8**	**4035.9**	**3967.7**	**4261.6**	**5622.1**	**6929.9**	**7827.2**	**3936.6**	**93590.0**	**28661.0**	**697.0**	**37319.0**	**43290.0**	**0.0**	203557.0	**522232.5**

A.2. 2006 Customized I-O Table

Table A.2: Customized 2006 I-O table (Million NZD)

	Industries	1 HFRG	2 SBLC	3 DAIF	4 OTHF	5 SAHF	6 FOLO	7 FISH	8 COAL	9 FUEL	10 OMIN	11 MEAT	12 DAIR	13 OFOD	14 BEVT	15 TCFL	16 WOOD
1	HFRG	34.3	64.0	130.7	7.2	22.6	17.8	0.1	0.0	0.1	0.0	113.4	0.0	159.4	138.1	2.0	0.2
2	SBLC	45.6	900.1	249.8	57.3	43.2	17.8	0.0	0.0	0.0	0.0	3065.0	0.0	90.6	40.4	113.8	1.0
3	DAIF	8.9	64.9	38.9	6.5	7.2	1.1	0.0	0.0	0.0	0.0	0.0	4470.4	11.2	9.5	3.2	0.2
4	OTHF	37.5	93.4	51.6	57.0	31.0	2.7	0.1	0.0	0.0	0.0	372.1	43.3	34.6	10.2	6.4	0.1
5	SAHF	204.0	341.9	163.0	44.3	146.2	197.7	0.9	0.2	0.3	0.3	205.5	0.0	12.8	3.9	2.1	2.5
6	FOLO	8.3	25.3	31.4	4.0	1.3	537.0	0.8	0.5	0.1	0.8	35.0	0.0	1.2	4.6	3.1	882.4
7	FISH	0.2	0.2	0.3	0.0	0.8	0.5	109.5	0.2	0.4	0.3	0.1	0.0	517.2	0.0	0.1	0.1
8	COAL	0.0	0.0	5.5	0.0	0.0	0.0	0.0	0.9	5.5	5.2	2.8	16.8	7.6	0.8	1.6	4.8
9	FUEL	16.8	79.0	52.5	29.7	68.8	93.6	33.6	74.0	2298.1	89.4	37.2	77.8	84.9	25.4	34.9	66.6
10	OMIN	6.9	23.6	22.3	4.0	0.7	1.2	0.4	23.8	71.5	55.2	0.0	0.0	0.0	0.0	0.0	0.0
11	MEAT	3.3	12.6	38.5	9.7	2.0	0.6	2.6	2.2	0.1	3.7	329.8	0.0	29.1	0.0	160.9	0.0
12	DAIR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5	0.0	0.0	742.2	29.1	17.0	0.0	65.5
13	OFOD	9.2	43.2	121.5	29.6	7.2	2.1	49.3	0.6	0.8	0.9	49.7	62.6	1117.9	104.3	3.6	10.6
14	BEVT	1.3	0.8	0.5	0.4	0.3	0.4	0.1	0.0	0.1	0.0	0.6	0.7	12.9	164.3	0.7	1.1
15	TCFL	2.2	1.7	6.1	0.4	4.0	4.1	1.6	0.0	0.6	0.0	1.5	1.9	5.9	4.5	193.1	11.8
16	WOOD	0.8	2.2	2.1	0.5	0.1	10.9	0.1	0.1	0.3	0.2	0.6	0.8	0.8	6.3	1.0	492.0
17	PAPR	51.7	3.8	2.7	4.4	1.8	2.4	0.2	0.7	1.1	1.1	4.3	5.4	10.2	23.8	1.5	30.2
18	PPRM	4.3	10.5	2.9	4.3	11.8	4.3	0.7	0.3	7.8	0.6	23.6	29.7	65.8	40.9	16.2	31.8
19	CHEM	59.4	195.4	217.3	31.9	37.0	31.8	1.2	1.0	13.2	1.6	14.8	17.9	14.4	4.0	4.4	78.1
20	RBPL	55.1	68.8	83.2	22.6	8.9	19.7	1.8	1.0	7.1	1.7	123.0	154.9	181.9	17.8	11.7	49.1
21	NMMP	2.3	6.4	6.5	1.3	0.9	1.2	0.2	3.3	17.7	5.5	0.5	0.7	5.0	42.0	0.3	3.6
22	BASM	0.7	2.5	1.6	0.4	5.1	14.2	0.1	0.9	9.4	1.4	22.6	28.4	19.0	9.2	7.2	29.9
23	FABM	14.8	38.4	35.9	7.7	9.0	21.2	6.0	2.3	11.9	3.8	35.4	44.6	67.1	170.4	15.3	42.7
24	MAEQ	7.3	20.9	25.3	4.0	39.6	7.2	40.3	1.1	51.4	1.9	7.4	9.3	14.7	13.7	7.1	7.5
25	OMFG	1.1	2.7	2.9	0.6	0.5	3.6	0.1	0.3	0.5	0.5	1.4	1.8	3.9	12.8	1.4	4.6
26	ELEC	87.3	46.4	87.2	25.6	4.7	10.0	7.0	6.7	45.6	33.8	127.3	115.9	89.2	21.5	21.6	118.3
27	WATS	0.0	0.0	0.0	0.0	5.5	0.1	3.1	0.2	1.1	0.3	37.2	19.2	4.3	11.4	1.4	0.0
28	WAST	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	9.7	20.7	10.5	0.1	1.2	28.0
29	CONS	19.3	52.4	50.0	11.1	4.4	19.4	6.3	41.0	148.5	67.3	2.1	2.7	3.2	6.1	4.8	13.2
30	TRDE	151.1	401.3	426.5	85.7	137.7	122.2	51.9	15.7	61.7	25.9	200.5	252.4	501.7	196.1	192.4	159.1
31	ACCR	1.9	3.0	2.4	0.9	2.2	2.0	0.1	0.4	1.6	0.6	1.2	1.5	2.3	1.4	1.3	1.5
32	RDFR	52.9	78.7	28.2	25.6	27.3	337.0	9.8	8.6	12.1	14.1	160.2	281.4	213.5	50.6	32.6	138.9
33	RDPS	0.4	0.8	0.5	0.4	0.5	0.4	0.2	0.0	0.0	0.1	0.5	0.6	0.6	0.3	0.1	0.3
34	RFRT	3.3	6.7	3.4	1.9	0.0	22.8	0.0	36.6	0.0	14.5	32.6	20.5	20.8	6.4	6.8	13.5
35	WFRT	0.0	0.0	0.0	0.0	0.0	6.8	2.7	3.8	53.6	26.4	43.8	0.0	11.6	5.7	0.0	12.1
36	OFRT	1.2	1.6	0.8	0.7	1.6	5.4	3.2	0.3	1.7	0.0	10.6	2.2	11.4	1.5	1.6	4.8
37	OTTR	9.5	13.1	6.6	5.3	12.7	45.0	25.5	4.6	22.6	5.4	92.8	18.6	93.1	13.3	13.2	40.7
38	COMM	39.8	61.0	28.4	32.6	18.4	24.7	6.2	2.9	9.9	4.8	25.8	32.5	41.2	17.5	13.8	27.5
39	FIIN	143.1	162.9	67.1	52.0	75.0	80.4	59.7	4.2	34.3	6.8	47.1	59.3	100.8	111.1	30.3	75.1
40	HOUS	33.4	60.0	65.0	2.8	9.6	8.5	1.5	0.7	5.5	1.1	20.9	26.3	28.7	11.3	18.3	18.9
41	EHOP	25.7	24.3	14.1	5.6	16.3	22.5	17.6	4.7	5.4	7.8	11.3	14.2	30.0	4.7	4.1	18.9
42	SRCS	30.4	46.0	21.7	6.6	31.8	29.0	13.1	4.1	111.0	6.7	60.2	75.9	54.0	59.2	10.9	20.7
43	OBUS	108.0	186.1	85.9	83.5	51.2	133.6	29.1	6.4	50.5	10.4	117.5	147.9	252.7	196.1	70.6	130.8
44	GOVC	7.5	25.2	14.3	3.7	2.3	6.9	2.2	0.4	0.9	0.6	1.9	2.4	3.6	1.5	1.5	18.6
45	GOVL	0.1	0.2	0.1	0.1	0.2	0.6	0.0	4.9	0.1	8.0	0.6	0.8	0.9	0.5	0.4	1.1
46	SCHL	0.9	2.0	1.5	0.5	0.4	0.9	0.1	0.1	0.6	0.2	0.5	0.6	1.2	0.7	0.7	4.3
47	OEDU	1.8	1.5	0.5	1.3	1.3	4.0	0.3	0.1	1.1	0.1	1.1	1.4	2.3	1.7	0.6	23.5
48	HOSP	0.3	0.5	0.6	0.0	0.2	1.1	0.1	0.0	0.1	0.0	0.2	0.3	0.3	0.1	0.2	0.2
49	OHCS	2.5	17.8	33.4	1.6	2.0	0.7	0.2	0.0	0.2	0.1	0.9	1.1	0.8	2.4	0.3	2.0
50	CULT	13.6	23.8	11.5	6.5	11.0	2.6	0.2	0.2	1.8	0.4	18.7	23.5	41.0	23.3	6.4	10.2
51	PERS	1.5	2.6	4.8	0.6	7.2	9.0	3.5	0.1	0.9	0.2	47.4	59.6	10.3	8.8	9.0	1.4
Other Imports		163.4	409.6	424.3	93.9	113.9	156.2	131.6	3.8	0.0	13.5	310.1	214.3	780.6	357.4	340.7	195.1
Compensation of Employees		749.7	1472.8	1123.0	180.5	663.4	448.3	104.5	37.0	175.0	127.2	1210.8	466.2	1071.1	382.1	515.4	784.1
Depreciation + Op Surplus		375.6	271.7	770.0	82.1	184.2	464.9	123.2	132.6	1748.8	180.6	189.5	1492.7	903.4	642.5	216.0	503.1
Net Indirect Taxes		55.8	216.5	155.3	32.7	9.2	19.7	-0.8	19.4	1163.8	13.1	10.3	51.7	34.0	1510.7	5.5	20.2
Adjustment		0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	-0.02	0.00	0.00	0.00	0.00
Gross Output		**2656.2**	**5590.9**	**4720.4**	**1071.8**	**1844.5**	**2978.1**	**851.5**	**452.9**	**6162.0**	**744.2**	**7239.7**	**9115.8**	**6816.1**	**4510.0**	**2113.3**	**4202.6**

	Industries	17 PAPR	18 PPRM	19 CHEM	20 RBPL	21 NMMP	22 BASM	23 FABM	24 MAEQ	25 OMFG	26 ELEC	27 WATS	28 WAST	29 CONS	30 TRDE	31 ACCR
1	HFRG	0.1	0.1	0.1	0.8	0.1	0.0	0.1	0.3	0.0	0.0	0.0	0.0	4.4	120.4	134.1
2	SBLC	0.2	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	508.5	15.4
3	DAIF	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	21.6	3.7
4	OTHF	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.8	26.7	7.3
5	SAHF	0.8	0.5	3.6	1.8	1.5	0.6	0.7	3.4	0.3	0.7	0.4	0.0	10.1	41.9	0.9
6	FOLO	126.5	2.2	2.6	0.6	0.9	0.5	2.1	4.6	3.6	0.9	0.0	0.0	55.2	127.1	0.2
7	FISH	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.1	1.0	0.2	0.0	0.0	0.5	37.4	1.1
8	COAL	1.9	0.3	0.0	1.4	14.1	83.2	0.0	0.0	0.0	79.5	0.0	0.0	0.0	4.3	0.2
9	FUEL	56.7	163.2	267.4	45.6	38.0	25.1	45.7	78.6	31.2	556.5	0.0	9.6	437.1	415.6	20.9
10	OMIN	0.0	0.0	3.0	12.5	127.3	53.6	14.8	2.2	7.4	0.0	0.0	3.5	116.8	11.2	0.0
11	MEAT	0.0	33.1	0.0	48.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.5	301.3
12	DAIR	16.8	8.3	6.8	26.2	10.7	1.0	10.2	32.2	15.8	0.3	0.0	0.0	1.0	818.4	200.9
13	OFOD	5.5	13.2	2.9	16.2	2.3	0.9	5.3	9.1	3.4	0.4	0.4	0.1	3.3	203.8	351.7
14	BEVT	0.4	2.5	0.3	1.3	0.5	0.3	1.1	2.2	0.6	0.1	0.0	0.0	1.0	83.1	819.5
15	TCFL	2.8	23.9	0.4	4.4	1.4	2.7	6.8	14.4	12.1	0.2	0.1	0.0	93.5	250.6	0.6
16	WOOD	40.7	7.6	0.2	4.7	29.8	2.7	12.5	12.6	231.6	0.2	0.0	0.0	1803.7	54.2	0.3
17	PAPR	414.0	195.5	2.6	53.8	13.9	2.2	1.7	11.1	10.3	18.9	0.3	0.1	58.7	177.7	5.1
18	PPRM	52.2	256.1	7.9	51.2	16.0	5.5	37.1	52.6	21.5	16.8	0.0	2.0	95.1	775.5	33.2
19	CHEM	43.8	7.7	334.7	260.5	7.9	4.4	29.4	34.8	11.2	3.1	1.8	0.4	33.5	108.5	1.7
20	RBPL	18.1	69.9	21.3	318.5	7.0	4.6	49.6	94.8	30.1	1.3	1.8	1.6	377.1	357.4	21.4
21	NMMP	0.6	2.4	0.3	3.8	323.5	5.6	25.5	105.2	7.4	0.1	3.9	2.0	1368.7	57.2	1.2
22	BASM	26.9	17.7	12.2	21.8	32.3	237.6	480.3	322.6	61.9	2.3	4.5	0.6	96.8	410.7	15.1
23	FABM	34.9	16.7	17.2	58.6	34.9	154.9	847.8	703.8	70.9	18.6	2.3	3.5	650.4	447.1	36.0
24	MAEQ	8.1	13.0	7.8	10.0	5.0	16.1	38.3	416.5	7.0	62.8	0.9	2.3	530.6	280.7	18.6
25	OMFG	2.0	6.6	0.6	5.9	2.7	5.9	21.2	37.4	85.6	0.6	2.7	0.2	198.5	76.1	23.4
26	ELEC	266.1	31.3	49.8	56.9	62.3	343.8	44.1	63.4	18.4	5253.5	47.7	2.8	92.6	488.4	149.6
27	WATS	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	2.3	302.3	0.1	4.4	46.9	2.6
28	WAST	0.1	3.1	4.6	2.0	0.1	0.7	0.2	11.7	1.4	1.0	1.5	184.9	65.1	3.0	0.5
29	CONS	15.4	2.7	1.3	4.9	45.3	2.5	18.1	167.8	5.1	504.2	0.1	9.8	7876.8	73.6	1.9
30	TRDE	151.0	132.8	81.7	76.9	53.7	178.5	209.2	532.2	77.4	73.0	0.0	22.3	1828.3	2986.6	478.9
31	ACCR	0.6	2.0	0.8	2.6	1.0	0.6	2.5	5.3	1.2	2.0	0.0	0.4	29.1	55.6	8.1
32	RDFR	53.5	57.5	129.5	77.6	86.9	89.1	56.1	87.3	32.5	3.2	1.2	5.4	108.8	953.7	1.8
33	RDPS	0.2	0.3	0.3	0.4	0.4	0.1	0.2	0.9	0.2	0.5	0.0	0.1	6.2	7.4	2.1
34	RFRT	24.8	11.3	24.7	15.2	10.5	10.6	12.4	14.2	6.6	0.0	0.0	0.0	5.2	22.2	0.0
35	WFRT	33.3	0.0	5.5	0.0	32.9	9.5	2.8	3.2	0.0	0.0	1.7	2.3	4.6	0.0	12.1
36	OFRT	7.3	2.7	3.7	3.7	0.6	1.7	1.8	6.3	1.6	0.9	0.0	0.0	4.9	83.9	0.0
37	OTTR	65.1	22.0	31.2	29.6	11.3	15.5	15.6	50.9	12.8	7.3	0.3	0.4	39.7	663.3	2.1
38	COMM	18.2	50.7	17.8	45.9	19.7	11.3	35.5	85.6	15.8	31.2	0.1	5.2	259.7	739.2	31.5
39	FIIN	33.2	68.8	32.6	67.6	31.4	115.9	63.0	109.3	28.4	120.1	2.6	5.8	277.8	1728.2	94.5
40	HOUS	4.7	28.4	7.7	27.7	10.8	6.0	41.6	56.8	21.2	64.9	0.0	2.6	165.0	1044.6	59.4
41	EHOP	5.5	18.0	12.7	11.6	6.3	4.6	11.6	27.5	5.7	29.0	3.4	4.8	53.1	152.0	9.6
42	SRCS	71.5	35.8	36.4	44.3	30.7	32.9	60.7	163.5	12.6	635.1	2.7	1.9	324.0	653.0	25.7
43	OBUS	47.6	160.4	52.3	186.7	77.9	35.7	128.2	262.4	60.4	201.1	9.8	11.5	881.4	2920.9	190.7
44	GOVC	2.9	2.9	1.0	2.6	3.7	0.8	3.5	5.4	4.3	3.4	0.1	0.8	29.3	80.3	5.8
45	GOVL	0.2	0.7	0.3	0.4	17.3	0.1	0.4	1.2	0.1	0.0	0.0	4.5	5.0	4.3	0.2
46	SCHL	0.4	6.0	0.2	1.4	0.3	0.2	2.4	2.2	0.5	5.7	0.0	0.1	5.2	13.8	1.1
47	OEDU	0.4	1.4	0.6	4.9	0.7	0.2	1.6	3.3	0.5	23.6	0.1	0.1	32.2	31.9	2.1
48	HOSP	0.2	0.3	0.2	0.8	0.3	0.1	0.4	0.8	0.2	0.6	0.0	0.0	2.4	8.9	0.5
49	OHCS	2.7	2.1	0.2	1.3	1.9	0.3	1.6	2.8	0.2	2.2	0.0	0.1	5.9	17.8	0.7
50	CULT	3.9	45.0	4.6	37.0	13.9	2.6	10.0	28.6	6.6	10.4	0.1	0.6	30.5	381.4	24.1
51	PERS	0.5	20.5	1.9	5.1	1.4	0.5	7.3	10.3	1.2	23.9	0.0	0.2	42.5	73.8	3.2
Other Imports		270.4	644.1	675.4	1110.8	192.4	250.4	772.0	1716.5	261.7	148.0	13.4	13.5	2577.2	2615.0	372.9
Compensation of Employees		389.9	980.5	247.0	756.8	434.6	422.2	1027.9	2087.1	423.4	441.6	69.4	135.3	4345.0	10145.3	1755.2
Depreciation + Op Surplus		574.0	620.4	542.4	534.1	456.9	1097.7	652.1	1231.0	305.1	2772.6	338.9	178.5	3911.2	6605.3	1052.4
Net Indirect Taxes		20.9	30.8	16.8	34.7	35.7	15.7	34.8	25.9	10.9	53.2	3.6	7.8	352.8	473.3	150.7
Adjustment		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gross Output		**2917.5**	**3823.3**	**2675.0**	**4092.5**	**2310.8**	**3257.3**	**4848.1**	**8703.5**	**1928.9**	**11178.2**	**818.1**	**627.7**	**29305.1**	**38500.1**	**6453.6**

Table A.2: Customized 2006 I-O table (Million NZD) - right hand side

32 RDFR	33 RDPS	34 RFRT	35 WFRT	36 OFRT	37 OTTR	38 COMM	39 FIIN	40 HOUS	41 EHOP	42 SRCS	43 OBUS	44 GOVC	45 GOVL	46 SCHL	47 OEDU	48 HOSP	49 OHCS	50 CULT	51 PERS	Private Consumption	Government Consumption	Stock Change	Gross Investment	Exports	Import Adjustments	Final Demand	Gross Output
0.1	0.0	0.0	0.1	0.1	0.7	0.1	1.3	9.9	1.7	2.7	5.2	3.1	0.1	0.2	0.4	39.2	1.3	2.9	0.5	383.7	0.0	-3.6	9.2	1247.1	0.0	1636.4	2656.2
0.8	0.0	0.1	0.1	0.2	1.7	0.0	0.4	3.6	4.5	3.0	1.4	2.6	0.0	0.1	0.2	3.3	0.9	16.8	0.2	58.0	0.0	1.0	4.2	336.0	0.0	399.3	5590.9
0.1	0.0	0.0	0.0	0.0	0.3	0.0	0.1	4.1	0.6	0.2	0.3	0.8	0.0	0.1	0.1	1.2	0.3	1.9	0.1	14.7	0.0	0.3	4.4	42.9	0.0	62.3	4720.4
0.2	0.0	0.1	0.1	0.1	0.8	0.0	0.7	5.0	5.6	0.4	1.1	3.6	0.0	0.1	0.2	4.2	1.6	9.3	0.4	140.0	0.0	0.5	5.1	117.7	0.0	263.3	1071.8
6.1	0.2	0.8	0.9	1.4	11.4	0.3	2.7	0.9	11.2	1.1	118.4	23.0	1.3	0.2	1.3	0.4	10.7	25.1	2.3	21.3	10.8	0.3	186.4	13.1	0.0	231.9	1844.5
10.2	0.3	0.3	0.4	0.6	4.6	0.6	1.6	1.9	1.4	1.7	178.7	1.2	1.4	1.9	0.7	0.3	0.5	1.1	0.7	51.5	0.0	96.0	36.7	721.1	0.0	905.4	2978.1
0.3	0.1	0.2	0.2	0.4	3.1	0.0	9.3	1.3	1.7	0.3	0.5	0.3	0.3	0.1	0.1	0.3	0.2	0.2	0.1	1.8	0.0	5.4	0.5	154.1	0.0	161.8	851.5
0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	8.6	3.8	5.2	11.3	0.7	0.6	0.4	11.4	0.0	0.0	23.2	150.3	0.0	184.9	452.9
185.3	35.2	11.0	74.3	45.0	368.6	11.4	9.3	17.5	9.0	38.6	28.5	114.4	44.1	10.5	20.8	30.5	45.3	11.0	10.8	1426.2	0.0	-27.7	1000.5	530.3	-3242.1	-312.8	6162.0
5.4	0.0	4.4	0.0	0.0	0.2	0.2	0.5	1.5	0.2	1.1	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	0.0	0.0	19.3	151.4	-7.4	167.8	744.2
0.0	0.0	0.0	0.0	0.1	0.9	0.0	0.0	0.0	0.0	0.0	0.0	7.7	0.0	1.1	4.6	4.9	0.3	7.5	0.3	2008.0	0.0	0.0	7.1	4208.7	-0.1	6223.8	7239.7
1.2	0.0	0.0	0.0	0.1	0.9	0.2	2.2	4.0	0.8	9.8	11.0	0.0	2.5	1.1	4.6	4.9	0.3	0.0	0.3	1081.7	0.0	-175.8	9.5	6148.8	-0.1	7064.2	9115.8
0.3	0.1	0.1	0.1	0.2	1.4	0.4	4.6	1.1	2.3	1.8	5.1	3.4	0.6	0.6	2.5	53.1	4.0	22.3	0.6	2255.7	8.3	-5.8	21.5	2200.2	-0.1	4479.9	6816.1
0.3	0.2	0.0	0.1	0.1	0.7	0.2	1.9	0.3	0.2	0.4	7.6	1.1	0.0	0.1	1.6	0.7	0.5	38.1	0.2	2519.1	0.0	10.3	2.8	826.6	0.0	3358.7	4510.0
1.0	0.5	0.1	0.1	0.2	1.3	0.2	0.7	72.8	0.7	1.4	9.3	17.0	1.6	4.8	7.0	3.7	1.9	11.3	0.3	378.7	0.0	12.9	7.3	925.3	-0.2	1323.9	2113.3
0.2	0.0	0.1	0.1	0.2	1.6	0.2	0.3	21.6	0.1	60.7	4.5	2.4	0.3	4.1	4.1	1.9	0.3	1.5	14.7	32.4	0.0	-25.8	30.2	1327.4	0.0	1364.1	4202.6
3.2	1.6	0.9	1.1	1.6	13.0	0.7	5.4	93.5	0.4	23.8	194.8	1.4	0.8	2.8	4.2	2.5	10.9	0.6	0.4	279.2	0.1	-1.5	2.3	1162.6	-0.2	1442.3	2917.5
12.8	4.5	3.6	4.4	6.8	54.4	82.0	134.3	47.1	25.1	99.0	529.8	73.9	7.4	38.1	43.7	19.8	51.9	91.0	79.3	435.3	0.0	6.3	21.0	274.8	-1.1	736.2	3823.3
10.0	1.7	1.2	1.5	2.3	18.7	0.5	0.8	2.1	2.3	2.0	8.3	3.9	1.9	2.5	2.7	14.4	13.3	2.4	6.7	85.4	0.0	-6.7	5.5	887.9	-3.3	968.7	2675.0
0.4	2.9	0.4	0.4	0.7	5.3	4.1	5.3	40.4	5.0	14.5	74.4	15.1	4.9	5.8	10.3	48.7	46.9	5.7	29.6	493.5	96.7	1.4	87.1	913.9	-3.2	1589.4	4092.5
8.5	3.0	0.1	0.1	0.2	1.5	2.3	1.0	19.3	15.3	46.0	3.0	0.7	0.3	3.4	1.6	0.2	2.2	0.2	2.7	44.0	0.0	0.2	24.9	128.5	-3.4	194.2	2310.8
0.7	0.4	0.2	0.2	0.3	2.4	0.5	11.8	2.3	1.0	45.3	16.0	1.3	0.6	5.7	2.7	0.6	3.5	5.0	0.5	24.6	0.0	0.7	34.8	1201.4	-1.0	1260.4	3257.3
2.3	1.1	1.9	2.4	3.6	29.2	6.9	16.0	143.2	10.2	29.6	13.9	30.5	10.4	8.0	9.9	6.1	1.5	6.1	1.0	110.3	0.0	18.6	211.9	551.9	-2.4	890.3	4848.1
15.3	12.1	12.7	15.6	24.0	192.5	102.5	6.9	21.1	32.1	37.0	55.2	95.6	49.4	26.1	59.0	50.8	7.3	48.9	12.9	740.4	3.4	31.0	2037.4	3373.4	-35.4	6150.2	8703.5
0.3	0.5	0.1	0.1	0.1	1.2	0.5	1.4	106.6	4.2	2.4	4.2	4.8	5.7	5.7	3.2	1.5	1.9	3.8	8.0	427.6	0.0	18.9	424.2	393.9	-0.1	1264.5	1928.9
6.6	3.3	10.5	0.7	7.1	56.6	51.4	38.3	6.8	10.7	63.8	80.1	90.8	106.5	55.5	125.8	45.4	63.4	75.1	21.3	2137.5	0.0	0.0	243.1	59.0	0.0	2439.7	11178.2
0.0	0.0	0.2	0.2	0.3	2.5	0.0	0.0	293.8	0.0	0.4	0.0	2.6	50.3	0.0	0.0	1.6	2.5	0.1	0.0	1.3	0.0	0.0	17.7	0.5	0.0	19.5	818.1
0.5	0.0	0.1	0.1	0.1	0.8	0.4	16.7	2.9	0.2	0.3	7.5	40.1	84.3	7.7	3.4	17.6	35.9	0.5	46.8	10.1	0.0	0.0	1.1	0.1	0.0	11.3	627.7
9.5	6.5	3.0	3.7	5.7	45.6	71.7	51.5	1440.7	9.0	27.1	21.6	384.3	716.1	35.9	154.1	37.2	106.5	126.0	61.7	179.4	6.0	3.6	16409.0	208.7	-0.2	16806.6	29305.1
407.7	117.7	17.8	24.0	34.7	279.1	156.1	179.3	456.4	134.2	128.7	500.0	277.2	58.7	106.5	99.0	253.4	155.8	87.4	7.0	16275.1	530.1	488.3	3846.0	4017.5	-2.1	25154.8	38500.1
3.0	0.6	2.6	3.2	5.0	40.0	1.8	10.7	3.0	2.6	13.4	20.4	123.8	7.6	37.0	41.9	24.2	67.9	25.1	14.6	3754.6	0.0	2.7	8.9	2102.8	0.0	5869.0	6453.6
1062.2	5.7	7.4	9.0	13.9	111.3	37.9	13.9	2.7	20.7	16.6	66.6	29.3	14.6	4.5	7.6	3.3	11.3	27.1	27.2	154.8	31.2	0.0	20.0	83.8	0.0	289.7	4998.2
9.1	7.7	0.6	0.7	1.0	8.4	0.6	7.3	0.2	2.0	15.7	18.7	11.2	0.4	20.3	16.0	4.6	16.8	14.8	12.1	306.3	164.5	0.3	5.1	134.2	0.0	610.4	803.7
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	147.6	0.0	0.0	8.4	0.0	0.0	156.0	503.5
113.0	19.9	70.9	0.0	1.3	14.3	22.3	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	68.7	0.0	0.0	24.8	0.0	0.0	93.5	615.4
9.3	0.0	2.3	4.3	19.2	152.3	6.9	6.9	1.0	4.6	13.3	24.5	15.2	1.7	0.7	3.5	1.1	2.1	7.6	3.0	106.1	2.4	0.3	11.1	380.9	-0.9	499.8	946.9
93.6	3.5	31.0	33.6	151.6	1203.8	58.2	55.7	7.7	36.5	104.7	193.3	119.7	13.2	5.7	27.4	8.5	16.3	59.8	23.8	856.6	19.2	2.2	92.3	3004.5	-7.0	3967.8	7604.7
203.7	16.5	6.6	8.1	12.4	99.6	1275.4	250.1	33.6	34.9	206.1	352.3	233.0	71.0	23.3	99.4	45.6	94.3	175.9	76.5	2047.8	0.0	-0.8	196.9	594.8	-0.4	2838.3	7911.0
100.4	31.0	27.1	33.1	51.0	409.4	104.7	4108.6	930.6	205.2	271.8	665.6	411.2	88.4	30.4	115.4	97.8	250.4	325.4	232.2	2988.7	29.7	0.5	221.3	498.6	-1.2	3737.5	16115.8
43.9	7.2	5.8	7.1	11.0	88.1	50.3	192.0	1320.9	42.3	112.0	259.3	298.6	14.9	10.8	39.9	18.5	160.9	207.3	60.3	17036.0	364.4	0.0	1088.0	199.3	0.0	18687.7	23492.6
52.5	20.5	34.1	41.7	64.2	515.8	15.2	53.1	29.2	173.3	77.8	105.0	89.0	74.3	3.3	29.7	27.0	43.1	57.2	32.9	135.9	0.4	1.3	45.8	333.5	-0.7	516.3	2637.5
5.6	7.1	5.8	7.1	10.9	87.4	99.1	539.7	13.1	36.7	1027.0	401.2	338.0	193.2	10.8	21.4	70.5	103.7	200.6	63.0	146.1	413.6	2.4	1429.6	389.4	-3.6	2377.5	8331.5
94.1	34.9	20.4	25.0	38.4	308.8	371.0	873.0	245.9	194.4	591.7	1800.4	772.7	195.4	109.2	250.8	197.7	411.4	653.5	422.5	485.0	187.7	0.4	307.3	724.2	-3.4	1701.3	16200.0
8.5	1.5	0.7	0.9	1.3	10.7	5.0	39.9	21.8	5.2	16.5	26.1	52.9	3.6	19.3	5.0	14.2	29.9	15.2	11.4	223.1	8520.0	-0.3	64.2	86.9	0.0	8893.9	9423.8
3.6	0.1	0.1	0.1	0.1	1.1	0.6	3.8	2.7	1.2	5.7	23.3	5.9	36.7	24.8	2.4	2.9	5.5	104.0	5.0	174.0	3499.2	0.0	16.2	63.8	0.0	3753.2	4035.9
0.8	0.4	0.4	0.5	0.7	5.8	2.9	3.7	4.1	1.3	5.5	10.2	14.4	4.1	13.3	18.0	5.7	5.4	13.9	11.0	139.2	3560.4	0.2	4.0	86.8	0.0	3790.7	3967.7
1.4	1.2	0.6	0.8	1.2	9.3	15.5	14.5	6.9	4.9	38.8	127.8	84.3	2.8	29.0	149.1	14.2	60.9	10.2	90.7	1122.9	1647.1	0.5	37.1	643.7	0.0	3451.2	4261.6
2.7	0.1	0.2	0.2	0.3	2.6	1.1	2.2	0.6	0.6	13.6	6.5	46.8	0.4	0.4	3.6	6.6	21.9	1.7	2.7	550.8	4906.0	0.0	11.2	19.3	0.0	5487.3	5622.1
1.9	0.7	0.5	0.6	0.9	7.6	1.1	12.4	4.3	3.8	11.1	14.7	60.7	13.8	11.1	9.6	143.4	598.9	34.5	4.9	2501.1	3300.7	0.3	23.3	61.9	0.0	5887.3	6929.9
5.3	2.0	2.6	3.2	4.9	39.3	100.9	47.6	14.9	21.2	35.6	607.6	47.2	77.0	58.6	22.8	5.3	21.1	969.9	43.4	3859.0	289.9	0.7	42.1	711.3	0.0	4903.0	7827.2
18.2	1.1	0.4	0.5	0.8	6.2	5.2	17.9	56.6	3.6	20.3	116.5	42.2	99.8	23.1	21.2	43.5	43.8	57.2	187.3	2602.5	85.4	0.6	13.8	109.8	0.0	2812.0	3936.6
142.9	88.3	49.6	60.8	92.7	744.5	611.0	271.4	333.0	202.3	426.0	979.8	425.8	83.5	115.2	183.8	380.4	302.0	560.6	224.7	14019.3	312.2	235.6	7961.6	0.0	3319.7	25848.4	47468.9
1045.4	279.9	119.8	132.1	197.6	1588.7	1294.1	3590.2	662.3	293.7	3181.8	4815.2	4347.2	1154.6	2795.0	2318.7	3561.8	2525.3	1545.8	1499.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	70120.6
751.9	182.3	67.8	111.7	117.8	952.6	3264.0	4349.4	14240.7	982.1	1438.9	3622.4	529.5	702.2	271.5	266.6	280.4	1548.3	1834.6	535.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	65203.4
535.8	-100.2	-23.8	0.0	12.4	96.2	72.7	1141.6	2735.4	74.6	44.2	61.0	121.7	24.3	18.2	34.9	5.8	16.3	322.7	43.3	8531.6	671.4	1.5	952.1	785.4	0.0	10942.0	20764.0
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01	-0.01	-0.01	-0.01	0.00	0.0	0.0
4998.2	803.7	503.5	615.4	946.9	7604.7	7911.0	16115.8	23492.6	2637.5	8331.5	16200.0	9423.8	4035.9	3967.7	4261.6	5622.1	6929.9	7827.2	3936.6	93590.0	28661.0	697.0	37319.0	43290.0	0.0	203557.0	522232.5

A.3. Data to Update I-O Table

Table A.3: Updating information of value added and final demand by industry (Million NZD, except FTE)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
	HFRG	SBLC	DAIF	OTHF	SAHF	FOLO	FISH	COAL	FUEL	OMIN	MEAT	DAIR	OFOD	BEVT	TCFL	WOOD	PAPR	PPRM	CHEM	RBPL	NMMP	BASM	FABM	MAEQ	OMFG
FTEi 2006	27,520	25,354	20,920	9,491	26,110	7,070	2,266	834	1,987	3,169	29,713	10,427	28,267	6,695	17,298	20,490	5,181	28,155	3,109	18,494	7,655	5,464	24,697	44,120	12,825
FTEi 2009	29,195	19,531	24,095	10,502	28,845	6,005	2,423	1,094	1,927	4,001	29,656	10,134	26,169	6,588	13,472	16,470	4,667	23,355	2,620	15,490	7,475	5,113	23,278	43,280	10,590
GDPi 2006	1,353	1,822	2,928	356	718	1,026	212	201	1,557	333	1,172	1,807	1,653	2,102	703	1,292	1,062	1,426	281	343	855	1,099	1,074	2,774	590
GDPi 2009	1,356	1,827	2,935	357	762	1,032	188	278	1,699	460	1,155	1,781	1,629	2,072	605	1,166	957	1,337	269	328	841	942	922	2,621	469
PPIi2006	1,242	1,214	1,128	1,074	1,340	887	1,218	1,764	1,261	1,764	1,195	1,358	1,223	1,332	1,035	1,096	1,061	1,314	1,216	1,165	1,213	1,222	1,203	1,246	1,183
PPIi2009	1,435	1,500	1,881	1,325	1,523	1,086	1,630	2,021	1,799	2,021	1,523	1,729	1,507	1,520	1,029	1,193	1,196	1,374	2,578	1,336	1,356	1,894	1,639	1,550	1,363
GOi 2006	2,656	5,591	4,720	1,072	1,845	2,978	852	453	6,162	744	7,240	9,116	6,816	4,510	2,113	4,203	2,918	3,823	2,675	4,092	2,311	3,257	4,848	8,704	1,929
GOi 2009	3,077	6,925	7,891	1,326	2,226	3,670	1,011	716	9,593	1,177	9,094	11,439	8,278	5,072	1,808	4,126	2,966	3,748	5,430	4,493	2,541	4,331	5,666	10,233	1,767
Labour Cost Index lci 06	1,117	1,117	1,117	1,117	1,073	1,106	1,143	1,143	1,120	1,112	1,112	1,112	1,112	1,113	1,108	1,108	1,094	1,143	1,143	1,130	1,119	1,119	1,120	1,117	1117
Labour Cost Index lci 09	1,315	1,315	1,315	1,315	1,259	1,309	1,260	1,260	1,286	1,224	1,224	1,224	1,224	1,224	1,217	1,217	1,193	1,260	1,260	1,253	1,238	1,238	1,244	1,198	1198
Wages 2006	750	1,473	1,123	181	663	448	104	37	175	127	1,211	466	1,071	382	515	784	390	980	247	757	435	422	1,028	2,087	423
Wages 2009	967	1,379	1,572	243	891	461	137	55	193	190	1,373	515	1,126	427	456	714	398	915	237	721	486	451	1,106	2,347	387
Taxes 2006	56	216	155	33	9	20	-1	19	1,164	13	10	52	34	1,511	6	20	21	31	17	35	36	16	35	26	11
Taxes 2009	63	263	255	40	11	24	-1	30	1,776	20	13	64	40	1,666	5	19	21	30	33	37	38	20	40	30	10
Capital 2006	376	272	770	82	184	465	123	133	1,749	181	190	1,493	903	643	216	503	574	620	542	534	457	1,098	652	1,231	305
Capital 2009	435	337	1,287	101	222	573	146	210	2,723	286	238	1,873	1,097	723	185	494	584	608	1,101	586	502	1,459	762	1,447	279
Imports FOB 2006	550	203	70	203	0	177	62	5,033	5,314	564	261	68	1,872	829	3,303	193	1,375	387	2,056	4,044	1,010	2,043	1,487	16,201	1,326
Imports FOB 2009	859	386	80	300	0	207	87	8,187	8,576	1,134	338	115	3,574	1,090	3,916	220	1,620	448	3,010	4,978	1,277	2,646	1,881	18,329	1,614
Imports 2006	163	410	424	94	114	156	132	4	0	13	310	214	781	357	341	195	270	644	675	1,111	192	250	772	1,716	262
Imports 2009	232	707	439	127	123	166	168	6	0	25	365	331	1,355	427	367	202	290	678	899	1,243	221	295	888	1,765	290
Total Value Added 2006	1,345	2,371	2,473	389	971	1,089	359	193	3,088	334	1,721	2,225	2,789	2,893	1,078	1,502	1,255	2,276	1,482	2,436	1,120	1,786	2,487	5,060	1,001
Total Value Added 2009	1,697	2,685	3,552	510	1,247	1,224	450	301	4,692	521	1,989	2,782	3,619	3,242	1,012	1,430	1,292	2,231	2,270	2,588	1,248	2,226	2,796	5,589	966
Exports FOB 2006	1,636	206	211	5,625	0	1,394	1,195	48	541	502	4,828	5,300	1,872	641	1,717	2,137	797	63	170	1,666	889	1,695	369	5,396	5,705
Exports FOB 2009	1,863	202	207	9,396	0	1,673	1,262	39	2,571	893	6,080	8,990	2,646	1,080	1,535	2,320	839	68	145	1,753	1,272	2,133	403	5,479	5,831
Exports 2006	1,247	336	43	118	13	721	154	150	530	151	4,209	6,149	2,200	827	925	1,327	1,163	275	888	914	129	1,201	552	3,373	394
Exports 2009	1,353	314	40	187	61	824	155	116	2,398	257	5,048	9,933	2,962	1,326	787	1,372	1,166	282	720	916	175	1,440	574	3,262	383
Import Adjust 2006	0	0	0	0	0	0	0	0	-3,242	-7	0	0	0	0	0	0	0	-1	-3	-3	-3	-1	-2	-35	0
Import Adjust 2009	0	0	0	0	0	0	0	0	-4,983	-11	0	0	0	0	0	0	0	-2	-5	-5	-5	-2	-4	-54	0
Stock Change 2006	-4	1	0	0	0	96	5	0	-28	0	0	-176	-6	10	13	-26	-2	6	-7	1	0	1	19	31	19
Stock Change 2009	-4	2	0	1	0	315	9	0	-28	0	0	-176	-6	17	23	28	2	15	7	2	0	1	46	76	47
Gross Invest 2006	9	4	4	5	186	37	1	23	1,000	19	7	9	22	3	7	30	2	21	6	87	25	35	212	2,037	424
Gross Invest 2009	10	5	5	5	200	39	1	25	1,075	21	8	10	23	3	8	32	2	23	6	94	27	37	228	2,189	456
Private Consum 2006	384	58	15	140	21	51	2	11	1,426	4	2,008	1,082	2,256	2,519	379	32	279	435	85	494	44	25	110	740	428
Private Consum 2009	444	67	17	162	25	60	2	13	1,651	5	2,325	1,252	2,612	2,917	439	38	323	504	99	571	51	29	128	857	495
Gov Consump 2006	0	0	0	0	11	0	0	0	0	0	0	0	8	0	0	0	0	0	0	97	0	0	0	3	0
Gov Consump 2009	8	1	6	7	14	3	0	0	41	2	55	22	17	54	7	8	8	10	2	124	1	1	5	4	9
Total Final Demand 2006	1,636	399	62	263	232	905	162	185	-313	168	6,224	7,064	4,480	3,359	1,324	1,364	1,442	736	969	1,589	194	1,260	890	6,150	1,265
Total Final Demand 2009	1,812	389	68	363	300	1,241	167	154	154	274	7,436	11,041	5,607	4,317	1,264	1,479	1,501	832	828	1,702	249	1,506	976	6,334	1,390

Table A.4: Updating information of value added and final demand by industry (Million NZD, except FTE) – continuation

	26 ELEC	27 WATS	28 WAST	29 CONS	30 TRDE	31 ACCR	32 RDFR	33 RDPS	34 RFRT	35 WFRT	36 OFRT	37 OTTR	38 COMM	39 FIIN	40* HOUS	41 EHOP	42 SRCS	43 OBUS	44 GOVC	45 GOVL	46 SCHL	47 OEDU	48 HOSP	49 OHCS	50 CULT	51 PERS
FTEi 2006	5,238	1,001	4,705	117,480	352,170	115,950	24,570	8,935	1,250	1,332	9,910	22,561	26,800	53,770	16,869	8,985	51,110	156,605	73,604	16,080	93,946	53,805	60,830	123,655	50,300	43,208
FTEi 2009	5,768	1,121	5,692	119,700	347,690	114,520	24,620	9,625	1,326	1,033	10,210	23,410	24,510	53,820	16,038	9,392	57,155	164,950	82,713	18,100	107,660	53,878	65,600	134,860	52,450	43,567
GDPi 2006	2,126	279	220	6,345	17,810	2,037	2,332	377	166	198	330	2,651	7,395	8,076	13,296	1,366	3,779	6,715	3,991	1,477	2,539	1,907	3,178	3,410	2,236	1,269
GDPi 2009	2,114	278	246	5,932	17,986	2,003	2,429	393	173	207	344	2,761	8,423	9,547	13,940	1,440	4,240	7,534	4,739	1,773	2,581	1,938	3,556	3,816	2,462	1,420
PPIi2006	1,570	1,384	1,268	1,305	1,203	1,223	1,285	1,251	1,184	1,126	1,209	1,184	912	1,187	1,162	1,078	1,239	1,239	1,202	1,257	1,169	1,169	1,173	1,173	1,316	1,268
PPIi2009	1,444	1,242	1,425	1,489	1,364	1,404	1,522	1,464	1,392	1,152	1,425	1,392	931	1,408	1,249	1,184	1,446	1,446	1,329	1,428	1,290	1,290	1,307	1,307	1,404	1,425
GOi 2006	11,178	818	628	29,305	38,500	6,454	4,998	804	503	615	947	7,605	7,911	16,116	23,493	2,637	8,331	16,200	9,424	4,036	3,968	4,262	5,622	6,930	7,827	3,937
GOi 2009	10,226	730	789	31,261	44,087	7,285	6,166	980	617	656	1,162	9,313	9,199	22,598	26,470	3,053	10,909	21,213	12,372	5,504	4,450	4,780	7,010	8,641	9,195	4,950
Labour Cost Index lci 06	1,143	1,137	1,152	2,218	1,079	1,115	1,115	1,115	1,115	1,115	1,115	1,105	1,126	1,114	1,114	1,114	1,114	1,116	1,127	1,167	1,167	1,160	1,160	1,109	1137	1137
lci 09	1,274	1,246	1,273	2,400	1,150	1,217	1,217	1,217	1,217	1,217	1,217	1,169	1,274	1,221	1,221	1,221	1,221	1,339	1,344	1,204	1,305	1,329	1,329	1,210	1246	1246
Wages 2006	442	69	135	4,345	10,145	1,755	1,045	280	120	132	198	1,589	1,294	3,590	662	294	3,182	4,815	4,347	1,155	2,795	2,319	3,562	2,525	1,546	1,499
Wages 2009	559	89	185	5,049	11,185	1,907	1,180	340	143	115	229	1,857	1,292	4,196	712	347	4,025	5,737	6,051	1,600	3,409	2,679	4,542	3,256	1,815	1,710
Taxes 2006	53	4	8	353	473	151	536	-100	-24	0	12	96	73	1,142	2,735	75	44	61	122	24	18	35	6	16	323	43
Taxes 2009	48	3	10	369	531	167	648	-120	-29	0	15	116	83	1,569	3,022	85	57	78	157	33	20	38	7	20	372	53
Capital 2006	2,773	339	179	3,911	6,605	1,052	752	182	68	112	118	953	3,264	4,349	14,241	982	1,439	3,622	530	702	272	267	280	1,548	1,835	535
Capital 2009	2,536	303	224	4,172	7,564	1,188	928	222	83	119	145	1,167	3,795	6,099	16,046	1,137	1,884	4,743	695	958	305	299	350	1,931	2,155	673
Imports FOB 2006	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Imports FOB 2009	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Imports 2006	148	13	14	2,577	2,615	373	143	88	50	61	93	744	611	271	333	202	426	980	426	84	115	184	380	302	561	225
Imports 2009	62	6	6	6,594	2,846	352	140	87	49	60	91	730	441	217	417	253	458	1,222	507	99	132	211	588	467	801	338
Total Value Added 2006	3,415	425	335	11,186	19,839	3,331	2,476	450	213	305	420	3,382	5,242	9,353	17,971	1,553	5,091	9,478	5,424	1,965	3,200	2,804	4,228	4,392	4,264	2,302
Total Value Added 2009	3,205	401	425	16,183	22,126	3,614	2,896	529	246	294	480	3,869	5,611	12,082	20,197	1,822	6,423	11,781	7,409	2,689	3,866	3,228	5,486	5,674	5,142	2,774
Exports FOB 2006	0	0	0	0	512	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exports FOB 2009	0	0	0	0	1,202	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exports 2006	59	1	0	209	4,017	2,103	84	134	0	0	381	3,005	595	499	199	334	389	724	87	64	87	644	19	62	711	110
Exports 2009	26	0	0	199	8,982	2,072	89	142	0	0	403	3,177	623	538	261	437	431	750	116	85	127	940	22	69	846	129
Import Adjust 2006	0	0	0	0	-2	0	0	0	0	0	-1	-7	0	-1	0	-1	-4	-3	0	0	0	0	0	0	0	0
Import Adjust 2009	0	0	0	0	-3	0	0	0	0	0	-1	-11	-1	-2	0	-1	-6	-5	0	0	0	0	0	0	0	0
Stock Change 2006	0	0	0	4	488	3	0	0	0	0	0	2	-1	0	0	1	2	0	0	0	0	0	0	0	1	1
Stock Change 2009	0	0	0	6	537	4	0	0	0	0	0	4	-1	1	0	2	4	1	-1	0	0	1	0	0	1	1
Gross Invest 2006	243	18	1	16,409	3,846	9	20	5	8	25	11	92	197	221	1,088	46	1,430	307	64	16	4	37	11	23	42	14
Gross Invest 2009	261	19	1	17,629	4,132	10	22	5	9	27	12	99	212	238	1,169	49	1,536	330	69	17	4	40	12	25	45	15
Private Consum 2006	2,138	1	10	179	16,275	3,755	155	306	148	69	106	857	2,048	2,989	17,036	136	146	485	223	174	139	1,123	551	2,501	3,859	2,602
Private Consum 2009	2,475	2	12	208	18,844	4,347	179	355	171	80	123	992	2,371	3,460	19,725	157	169	562	258	201	161	1,300	638	2,896	4,468	3,013
Gov Consump 2006	0	0	0	6	530	0	31	164	0	0	2	19	0	30	364	0	414	188	8,520	3,499	3,560	1,647	4,906	3,301	290	85
Gov Consump 2009	49	1	1	8	680	81	37	211	9	8	9	25	65	88	552	46	530	241	10,923	4,486	3,915	2,112	6,290	4,232	372	110
Total Final Demand 2006	2,440	20	11	16,807	25,155	5,869	290	610	156	93	500	3,968	2,838	3,738	18,688	516	2,378	1,701	8,894	3,753	3,791	3,451	5,487	5,887	4,903	2,812
Total Final Demand 2009	2,810	21	14	18,049	33,172	6,514	326	713	189	114	546	4,286	3,269	4,324	21,707	690	2,665	1,877	11,366	4,791	4,208	4,392	6,961	7,222	5,732	3,268

Table A.4: Updating information for final demand (Million NZD)

Final Demand Consumption	2006	2009
Final consumption expenditure		
Private	95,498	110,570
General government	28,702	36,798
Gross capital formation		
Change in inventories	1,100	1,804
Residential buildings	10,528	9,400
Other fixed assets	28,027	32,022
Gross national expenditure	138,292	163,856
Exports of goods and services	40,772	43,932
Less imports of goods and services	47,841	47,515
Expenditure on gross domestic product	131,777	160,273

A.4. RAS Algorithm for Matlab

```
function A = ras(A0,rowsum,colsum) %A0 is the initial Zij matrix of the
outdated year
tol=1.e-12; %maximum error
rowsum=rowsum(:); %rowsum is the row sum of the matrix Zij for the
target year
colsum=colsum(:)'; %colsum is the column sum of the matrix Zij for the
target year

if (abs(sum(rowsum)-sum(colsum))/abs(sum(rowsum)))>tol
  error 'rowsum and colsum must both sum to the same amount'
end

A=A0;
flag=1;
iter=0;
while flag
  % row sums
  rs=sum(A,2);
    A=diag(rowsum./rs)*A;

  % column sums
  cs=sum(A,1);
  A=A*diag(colsum./cs);

  rerr=max(abs(rs-rowsum))/sum(rowsum);
  cerr=max(abs(cs-colsum))/sum(rowsum);

  if (rerr<=tol) & (cerr<=tol)
    flag=0;
  end
  iter=iter+1;
```

```
  disp(['iter,rerr,cerr: ',num2str([iter,rerr,cerr])]);
end

xlswrite('A_matrixv2.xls',A)
```

A.5. 2009 I-O Table

Table A.5: Updated 2009 I-O table (Million NZD)

	Industries	1 HFRG	2 SBLC	3 DAIF	4 OTHF	5 SAHF	6 FOLO	7 FISH	8 COAL	9 FUEL	10 OMIN	11 MEAT	12 DAIR	13 OFOD	14 BEVT	15 TCFL	16 WOOD
1	HFRG	33.0	74.5	221.4	7.7	22.7	20.8	0.1	0.0	0.1	0.0	137.1	-	181.3	156.6	1.5	0.2
2	SBLC	46.0	1,097.7	443.2	64.4	45.4	21.8	0.0	0.0	0.0	0.0	3,883.4	-	107.9	48.1	90.2	1.0
3	DAIF	19.8	173.8	151.6	16.0	16.6	3.1	0.0	0.0	0.0	0.0	-	7,286.3	29.3	24.7	5.5	0.3
4	OTHF	36.9	111.2	89.3	62.5	31.8	3.2	0.1	0.0	0.0	0.0	460.2	31.4	40.2	11.8	5.0	0.1
5	SAHF	198.1	401.9	278.9	48.0	148.1	232.8	0.9	0.2	0.4	0.4	250.9	-	14.7	4.5	1.6	2.3
6	FOLO	8.9	32.8	59.3	4.8	1.5	698.4	0.9	0.7	0.2	1.2	47.2	-	1.5	5.8	2.6	893.5
7	FISH	0.2	0.2	0.5	0.0	0.9	0.7	121.6	0.2	0.6	0.4	0.1	-	642.0	0.0	0.1	0.1
8	COAL	-	-	17.9	-	-	-	-	2.2	14.0	13.6	6.6	23.1	16.7	1.8	2.4	8.5
9	FUEL	20.1	114.4	110.7	39.6	86.0	135.8	42.6	122.5	3,716.3	149.3	55.9	68.5	120.2	35.9	32.9	75.2
10	OMIN	9.7	39.9	54.9	6.2	1.1	2.1	0.6	46.2	135.3	107.9	-	-	-	-	-	-
11	MEAT	4.4	20.1	89.7	14.3	2.7	1.0	3.6	4.1	0.1	6.8	548.2	-	45.4	-	167.4	-
12	DAIR	-	-	-	-	-	-	-	-	1.4	-	-	101.4	6.4	3.7	-	11.5
13	OFOD	8.5	48.4	198.1	30.5	6.9	2.4	48.3	0.7	1.0	1.2	57.9	42.7	1,224.0	113.9	2.6	9.3
14	BEVT	0.6	0.4	0.4	0.2	0.2	0.2	0.1	0.0	0.1	0.0	0.3	0.2	7.2	91.6	0.3	0.5
15	TCFL	1.5	1.4	7.3	0.3	2.8	3.4	1.1	0.0	0.5	0.0	1.3	1.0	4.7	3.6	103.2	7.5
16	WOOD	0.9	2.9	4.1	0.6	0.1	14.8	0.1	0.2	0.5	0.3	0.9	0.6	1.1	8.3	0.9	520.6
17	PAPR	47.1	4.2	4.4	4.5	1.8	2.6	0.2	0.9	1.4	1.4	5.0	3.7	11.0	25.5	1.0	26.0
18	PPRM	3.5	10.3	4.2	3.9	9.9	4.2	0.6	0.4	8.5	0.6	24.0	17.7	62.8	38.9	10.3	24.2
19	CHEM	119.3	474.8	768.3	71.4	77.5	77.4	2.5	2.7	35.9	4.5	37.4	26.5	34.1	9.4	6.9	148.0
20	RBPL	57.2	86.5	152.2	26.1	9.7	24.8	1.9	1.5	10.0	2.5	160.7	118.5	223.5	21.8	9.6	48.1
21	NMMP	2.9	9.8	14.3	1.8	1.2	1.8	0.3	5.8	30.0	9.6	0.9	0.6	7.4	62.1	0.3	4.3
22	BASM	0.8	3.8	3.4	0.5	6.6	21.2	0.1	1.5	15.6	2.5	35.0	25.8	27.7	13.4	7.0	34.9
23	FABM	16.1	50.5	68.7	9.4	10.3	27.9	6.9	3.5	17.5	5.8	48.5	35.7	86.2	218.5	13.1	43.8
24	MAEQ	10.2	35.5	62.8	6.2	58.2	12.3	60.0	2.2	97.6	3.7	13.1	9.7	24.5	22.7	7.8	10.0
25	OMFG	0.6	1.9	2.9	0.4	0.3	2.5	0.1	0.2	0.4	0.4	1.0	0.8	2.6	8.6	0.6	2.5
26	ELEC	70.2	45.2	123.6	23.0	4.0	9.8	6.0	7.5	49.6	38.0	128.9	68.7	84.9	20.5	13.7	89.9
27	WATS	-	-	-	-	4.8	0.1	2.7	0.2	1.2	0.3	38.8	11.7	4.2	11.2	0.9	-
28	WAST	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	14.3	17.8	14.5	0.1	1.1	30.9
29	CONS	22.9	75.2	104.5	14.6	5.4	27.9	7.9	67.2	238.0	111.4	3.1	2.3	4.5	8.6	4.5	14.8
30	TRDE	108.7	349.5	540.5	68.7	103.4	106.6	39.5	15.7	60.0	26.0	181.4	133.8	427.0	166.4	108.9	108.1
31	ACCR	2.2	4.3	5.1	1.2	2.7	2.9	0.1	0.6	2.5	1.0	1.8	1.4	3.3	1.9	1.3	1.7
32	RDFR	55.5	100.0	52.1	30.0	29.9	429.4	10.9	12.4	17.2	20.6	211.6	217.7	265.2	62.7	26.9	137.8
33	RDPS	0.5	1.2	1.1	0.6	0.6	0.6	0.2	0.1	0.1	0.1	0.8	0.6	0.9	0.4	0.1	0.4
34	RFRT	3.4	8.4	6.1	2.1	-	28.4	-	52.0	-	20.9	42.2	15.5	25.3	7.8	5.5	13.1
35	WFRT	-	-	-	-	-	6.9	2.4	4.4	60.4	30.8	46.0	-	11.5	5.6	-	9.5
36	OFRT	1.4	2.3	1.7	0.9	2.0	7.6	3.9	0.4	2.6	-	15.5	1.9	15.7	2.1	1.5	5.3
37	OTTR	11.0	18.6	13.6	6.9	15.4	63.6	31.4	7.4	35.6	8.8	136.2	16.0	128.5	18.3	12.2	44.8
38	COMM	38.6	71.6	48.6	35.2	18.7	29.1	6.4	3.9	13.0	6.5	31.5	23.3	47.3	20.0	10.6	25.2
39	FIIN	172.7	237.9	142.6	70.0	94.5	117.7	76.2	6.9	55.9	11.5	71.4	52.7	143.8	158.1	28.7	85.6
40	HOUS	28.6	62.1	98.0	2.7	8.6	8.9	1.3	0.8	6.4	1.3	22.5	16.6	29.0	11.4	12.3	15.3
41	EHOP	24.6	28.1	23.7	6.0	16.3	26.1	17.9	6.3	7.0	10.4	13.6	10.0	34.0	5.3	3.1	17.1
42	SRCS	36.1	66.0	45.2	8.7	39.3	41.7	16.5	6.7	177.9	11.1	89.8	66.3	75.8	82.8	10.1	23.2
43	OBUS	123.2	257.1	172.7	106.2	61.0	185.0	35.2	10.0	77.9	16.6	168.6	124.4	341.2	264.0	63.4	140.9
44	GOVC	12.4	50.5	41.6	6.8	3.9	13.8	3.9	0.8	2.1	1.4	3.9	2.9	7.0	3.0	1.9	29.0
45	GOVL	0.2	0.6	0.3	0.1	0.4	1.6	0.1	15.7	0.5	26.0	1.8	1.3	2.6	1.3	0.8	2.4
46	SCHL	1.1	3.0	3.4	0.8	0.5	1.3	0.2	0.2	1.0	0.3	0.8	0.6	1.8	1.0	0.7	5.1
47	OEDU	0.8	0.8	0.4	0.6	0.6	2.1	0.1	0.0	0.6	0.1	0.6	0.4	1.2	0.8	0.2	9.3
48	HOSP	0.1	0.2	0.3	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.1
49	OHCS	3.1	26.6	72.6	2.2	2.5	1.0	0.2	0.1	0.3	0.1	1.4	1.0	1.2	3.5	0.3	2.3
50	CULT	13.9	29.5	20.8	7.4	11.7	3.2	0.2	0.3	2.5	0.5	24.0	17.7	49.7	28.2	5.2	9.8
51	PERS	2.0	4.2	11.2	0.9	9.9	14.5	5.0	0.2	1.5	0.3	78.7	58.0	16.1	13.7	9.3	1.8
	Other Imports	232.1	706.9	438.7	126.6	123.4	166.1	168.1	5.6	-	24.7	365.5	330.8	1,355.1	426.9	367.2	202.3
	Compensation of Employees	966.6	1,378.8	1,572.0	242.8	890.7	461.2	136.5	55.3	193.0	190.3	1,372.7	514.7	1,126.4	427.1	455.5	714.4
	Depreciation + Op Surplus	435.1	336.5	1,287.2	101.5	222.3	572.9	146.2	209.8	2,722.5	285.7	238.0	1,873.1	1,097.1	722.6	184.8	493.8
	Net Indirect Taxes	63.4	262.9	254.6	39.6	10.8	23.8	-0.9	30.1	1,776.3	20.3	12.6	63.7	40.5	1,665.8	4.6	19.4
	Gross Output	**3,076.5**	**6,925.1**	**7,891.0**	**1,325.6**	**2,226.1**	**3,669.8**	**1,010.5**	**716.5**	**9,593.2**	**1,177.2**	**9,094.0**	**11,439.0**	**8,278.0**	**5,072.4**	**1,808.1**	**4,125.6**

	Industries	17 PAPR	18 PPRM	19 CHEM	20 RBPL	21 NMMP	22 BASM	23 FABM	24 MAEQ	25 OMFG	26 ELEC	27 WATS	28 WAST	29 CONS	30 TRDE	31 ACCR
1	HFRG	0.1	0.1	0.1	0.8	0.1	0.0	0.1	0.3	0.0	-	-	0.0	3.2	139.6	190.6
2	SBLC	0.2	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	-	-	0.0	1.5	617.5	22.9
3	DAIF	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.1	0.0	-	-	0.0	0.7	57.5	12.1
4	OTHF	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	-	-	0.0	0.6	31.6	10.6
5	SAHF	0.8	0.5	6.9	1.7	1.4	0.8	0.7	3.9	0.2	0.7	0.4	0.0	7.3	49.1	1.3
6	FOLO	139.2	2.3	5.6	0.6	0.9	0.7	2.5	5.8	3.3	0.9	0.0	0.0	44.1	164.2	0.2
7	FISH	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.2	0.9	0.2	0.0	0.0	0.4	47.3	1.7
8	COAL	3.7	0.6	-	2.5	24.6	207.7	-	-	-	144.9	-	-	-	9.7	0.4
9	FUEL	69.7	192.2	637.8	53.1	42.5	40.3	61.1	110.7	31.8	651.7	0.0	12.6	390.0	599.4	37.0
10	OMIN	-	-	8.3	17.0	166.6	100.6	23.2	3.7	8.8	-	0.0	5.3	121.9	18.9	-
11	MEAT	-	43.1	-	62.5	-	-	-	-	-	-	-	-	-	16.8	588.8
12	DAIR	3.2	1.5	2.5	4.7	1.9	0.3	2.1	7.0	2.5	0.1	0.0	0.0	0.1	182.9	55.1
13	OFOD	5.2	12.0	5.4	14.6	2.0	1.1	5.5	9.9	2.7	0.4	0.3	0.1	2.3	227.4	481.2
14	BEVT	0.2	1.1	0.3	0.6	0.2	0.2	0.6	1.2	0.2	0.1	0.0	0.0	0.3	47.3	572.3
15	TCFL	1.9	16.0	0.6	2.9	0.9	2.4	5.2	11.5	7.0	0.2	0.1	0.0	47.4	205.1	0.6
16	WOOD	46.9	8.4	0.5	5.1	31.2	4.1	15.7	16.7	221.1	0.3	0.0	0.0	1,507.4	73.3	0.4
17	PAPR	386.9	175.2	4.7	47.6	11.8	2.7	1.8	11.9	7.9	16.9	0.3	0.1	39.9	194.8	6.9
18	PPRM	43.3	203.4	12.7	40.1	12.1	5.9	33.4	50.0	14.8	13.3	0.0	1.7	57.2	754.2	39.6
19	CHEM	90.3	15.2	1,338.9	508.5	14.9	11.9	66.0	82.3	19.2	6.1	3.5	0.8	50.2	262.5	5.0
20	RBPL	19.3	71.5	44.0	321.7	6.8	6.4	57.5	115.9	26.6	1.3	1.8	1.9	292.2	447.5	32.8
21	NMMP	0.8	2.9	0.8	4.6	379.2	9.4	35.6	155.2	7.9	0.1	4.8	2.7	1,279.2	86.5	2.3
22	BASM	34.1	21.5	29.9	26.2	37.3	393.0	661.0	468.3	65.0	2.8	5.4	0.7	89.0	610.4	27.5
23	FABM	38.9	17.8	37.3	62.0	35.5	225.7	1,028.5	900.6	65.7	19.8	2.4	4.2	527.3	585.8	57.8
24	MAEQ	11.7	18.1	21.8	13.7	6.5	30.4	60.1	689.8	8.4	86.5	1.2	3.6	556.6	475.9	38.6
25	OMFG	1.1	3.7	0.6	3.2	1.5	4.5	13.4	25.0	41.4	0.3	1.5	0.1	84.1	52.1	19.7
26	ELEC	220.0	24.8	79.9	44.5	46.9	371.0	39.6	60.1	12.6	4,138.2	37.5	2.5	55.6	473.9	178.0
27	WATS	0.1	-	-	-	-	-	-	1.6	-	1.9	244.9	0.1	2.7	47.0	3.2
28	WAST	0.1	3.6	10.7	2.3	0.1	1.1	0.2	16.1	1.4	1.2	1.7	236.4	56.6	4.2	0.9
29	CONS	18.7	3.2	3.1	5.7	50.3	3.9	23.9	234.3	5.2	585.3	0.1	12.7	6,968.1	105.3	3.4
30	TRDE	111.5	94.0	117.1	53.8	36.1	172.2	168.0	450.6	47.5	51.4	-	17.6	980.8	2,589.5	509.2
31	ACCR	0.7	2.4	1.8	3.0	1.2	1.0	3.3	7.5	1.2	2.3	0.0	0.5	25.8	80.0	14.4
32	RDFR	57.7	59.5	271.1	79.2	85.4	125.4	65.8	108.0	29.1	3.3	1.3	6.2	85.2	1,207.2	2.7
33	RDPS	0.2	0.3	0.7	0.4	0.5	0.2	0.3	1.3	0.2	0.5	0.0	0.1	5.6	10.9	3.8
34	RFRT	26.2	11.4	50.7	15.2	10.1	14.7	14.2	17.1	5.7	-	-	-	4.0	27.5	-
35	WFRT	28.5	-	9.2	-	25.7	10.7	2.6	3.1	-	-	1.4	2.1	2.9	-	14.9
36	OFRT	8.8	3.1	8.5	4.1	0.7	2.6	2.4	8.6	1.6	1.1	-	-	4.3	117.9	-
37	OTTR	77.9	25.3	72.4	33.6	12.3	24.2	20.4	69.9	12.7	8.4	0.3	0.5	34.6	932.4	3.7
38	COMM	18.1	48.5	34.3	43.3	17.9	14.7	38.4	97.7	13.1	29.6	0.1	5.5	187.8	864.2	45.2
39	FIIN	41.1	81.7	78.3	79.3	35.5	187.5	84.8	155.2	29.2	141.8	3.0	7.7	249.9	2,513.0	168.5
40	HOUS	4.1	23.9	13.1	23.1	8.7	6.9	39.8	57.2	15.4	54.3	0.0	2.5	105.3	1,077.6	75.1
41	EHOP	5.4	17.0	24.2	10.8	5.7	5.9	12.4	31.0	4.7	27.2	3.2	5.0	37.9	175.4	13.6
42	SRCS	87.1	41.8	85.9	51.1	34.1	52.3	80.3	228.2	12.7	737.0	3.1	2.5	286.5	933.3	45.0
43	OBUS	55.8	180.2	118.9	207.1	83.1	54.6	163.2	352.5	58.7	224.6	10.9	14.4	750.0	4,017.2	321.7
44	GOVC	4.9	4.7	3.3	4.2	5.7	1.8	6.5	10.5	6.1	5.5	0.1	1.5	36.1	160.0	14.3
45	GOVL	0.5	1.7	1.3	0.9	37.6	0.4	1.0	3.3	0.3	-	-	11.4	8.7	11.9	0.6
46	SCHL	0.5	7.3	0.6	1.7	0.4	0.3	3.4	3.2	0.5	6.9	0.0	0.1	4.8	20.7	2.1
47	OEDU	0.2	0.6	0.5	2.0	0.3	0.1	0.8	1.6	0.2	9.7	0.0	0.0	10.1	16.2	1.3
48	HOSP	0.1	0.1	0.1	0.2	0.1	0.0	0.1	0.3	0.0	0.2	0.0	0.0	0.6	3.4	0.2
49	OHCS	3.5	2.6	0.5	1.6	2.2	0.4	2.2	4.1	0.2	2.7	0.1	0.1	5.4	26.5	1.3
50	CULT	4.1	45.4	9.4	36.8	13.4	3.6	11.4	34.5	5.8	10.4	0.1	0.7	23.3	471.1	36.5
51	PERS	0.7	26.7	4.9	6.5	1.7	0.9	10.8	16.0	1.3	30.8	0.0	0.2	41.9	117.5	6.3
	Other Imports	289.5	678.0	898.9	1,243.0	221.3	294.8	888.0	1,765.4	289.6	61.6	5.6	5.6	6,593.6	2,845.5	352.1
	Compensation of Employees	398.1	915.3	236.8	721.1	485.7	451.1	1,106.1	2,346.8	387.0	559.4	89.5	185.1	5,048.7	11,185.0	1,906.8
	Depreciation + Op Surplus	583.6	608.2	1,100.9	586.4	502.4	1,459.5	762.1	1,447.3	279.4	2,536.3	302.5	224.4	4,172.1	7,563.8	1,188.0
	Net Indirect Taxes	20.8	29.6	33.4	37.3	38.5	20.4	39.9	29.9	9.8	47.7	3.1	9.7	369.0	531.4	166.8
	Gross Output	**2,966.0**	**3,748.4**	**5,429.5**	**4,493.1**	**2,540.9**	**4,330.6**	**5,665.9**	**10,232.6**	**1,766.6**	**10,225.5**	**730.2**	**789.3**	**31,260.6**	**44,086.7**	**7,285.0**

Table A.5: Updated 2009 I-O table (Million NZD) – Continuation, right hand side

32 RDFR	33 RDPS	34 RFRT	35 WFRT	36 OFRT	37 OTTR	38 COMM	39 FIIN	40 HOUS	41 EHOP	42 SRCS	43 OBUS	44 GOVC	45 GOVL	46 SCHL	47 OEDU	48 HOSP	49 OHCS	50 CULT	51 PERS	Private Consumption	Government Consumption	Stock Change	Gross Investment	Exports	Import Adjustments	Final Demand	Gross Output
0.2	0.0	0.1	0.1	0.1	0.8	0.1	1.6	10.6	1.8	3.3	6.7	3.5	0.1	0.1	0.4	38.8	1.3	2.9	0.5	444.2	8.3	-3.9	9.9	1,353.0	-0.0	1,811.5	**3,076.5**
1.0	0.0	0.1	0.1	0.2	2.0	0.0	0.6	4.1	5.0	3.9	1.9	3.0	0.0	0.1	0.2	3.4	1.0	17.6	0.3	67.2	1.3	1.7	4.5	314.2	-0.0	388.8	**6,925.1**
0.2	0.0	0.0	0.0	0.1	0.6	0.0	0.3	10.1	1.5	0.4	0.8	2.1	0.0	0.1	0.2	2.8	0.8	4.3	0.3	17.0	5.9	0.4	4.7	40.1	-	68.2	**7,891.0**
0.3	0.0	0.1	0.1	0.1	0.9	0.0	0.9	5.5	5.9	0.6	1.5	4.1	0.0	0.0	0.2	4.3	1.7	9.4	0.4	162.1	7.1	0.8	5.5	187.3	-0.0	362.7	**1,325.6**
7.7	0.2	0.9	0.9	1.6	12.9	0.4	3.5	1.0	11.8	1.4	155.4	25.9	1.4	0.1	1.4	0.4	11.1	25.3	2.7	24.7	13.9	0.4	200.2	61.2	-0.0	300.4	**2,226.1**
14.0	0.4	0.4	0.4	0.7	5.8	0.8	2.3	2.2	1.6	2.3	259.0	1.5	1.8	1.5	0.8	0.3	0.6	1.2	0.9	59.6	3.1	314.9	39.4	824.4	-0.0	1,241.4	**3,669.8**
0.4	0.2	0.3	0.3	0.5	3.8	0.0	13.2	1.5	2.0	0.4	0.7	0.4	0.4	0.1	0.1	0.3	0.2	0.2	0.2	2.1	0.1	8.9	0.6	155.0	-0.1	166.6	**1,010.5**
-	-	-	0.4	-	0.1	-	-	-	-	-	-	1.8	19.0	5.0	10.2	21.6	1.5	1.2	0.9	13.2	0.5	-	24.9	115.6	-	154.2	**716.5**
284.3	55.1	16.4	93.8	63.3	516.0	18.1	15.0	23.4	11.7	58.4	46.1	158.8	62.6	8.9	26.5	37.6	57.9	13.7	15.7	1,651.3	40.5	-27.7	1,074.9	2,397.9	-4,983.0	153.9	**9,593.2**
9.6	0.1	7.8	-	-	0.4	0.5	1.0	2.3	0.3	2.0	1.8	-	-	-	-	-	-	-	-	5.2	2.3	0.0	20.7	256.7	-11.3	273.6	**1,177.2**
-	-	-	-	0.2	1.3	-	-	-	-	-	-	11.8	-	1.0	6.5	6.6	0.4	10.3	0.4	2,324.9	55.4	-	7.6	5,048.5	-0.1	7,436.3	**9,094.0**
0.3	0.0	-	-	0.0	0.2	0.0	0.6	0.8	0.2	2.3	2.8	-	0.5	0.1	0.9	0.9	0.1	-	0.1	1,252.4	21.7	-175.8	10.2	9,932.7	-	11,041.1	**11,439.0**
0.3	0.1	0.1	0.1	0.2	1.5	0.5	5.8	1.2	2.3	2.1	6.4	3.7	0.7	0.4	2.5	50.7	4.0	21.4	0.6	2,611.7	16.7	-6.4	23.1	2,961.9	-0.2	5,606.9	**8,278.0**
0.2	0.1	0.0	0.0	0.0	0.4	0.1	1.2	0.1	0.1	0.2	4.9	0.6	0.0	0.0	0.8	0.4	0.2	18.7	0.1	2,916.7	54.5	16.9	3.0	1,326.2	-0.0	4,317.1	**5,072.4**
0.8	0.5	0.1	0.1	0.1	1.0	0.2	0.7	55.0	0.5	1.2	8.5	13.4	1.3	2.3	5.1	2.6	1.4	7.9	0.3	438.5	7.1	23.2	7.8	787.5	-0.3	1,263.8	**1,808.1**
0.3	0.0	0.1	0.1	0.3	2.0	0.2	0.4	26.9	0.1	85.9	6.8	3.1	0.4	3.3	4.9	2.2	0.3	1.7	20.0	37.5	7.7	28.4	32.4	1,372.4	-0.0	1,478.5	**4,125.6**
3.8	1.9	1.0	1.0	1.7	13.8	0.8	6.6	94.7	0.4	27.4	239.6	1.4	0.9	1.8	4.0	2.3	10.6	0.6	0.4	323.2	8.1	1.5	2.4	1,166.2	-0.3	1,501.1	**2,966.0**
13.2	4.8	3.6	3.7	6.4	51.3	87.5	146.5	42.3	21.9	100.9	577.9	69.1	7.1	21.8	37.5	16.5	44.7	76.2	77.8	504.0	9.7	15.4	22.5	282.0	-1.8	831.9	**3,748.4**
25.8	4.5	3.1	3.2	5.5	43.8	1.4	2.3	4.7	5.0	5.1	22.5	9.0	4.5	3.6	5.8	29.8	28.5	4.9	16.2	98.9	1.8	6.7	5.9	719.9	-5.1	828.1	**5,429.5**
0.6	4.0	0.5	0.5	0.8	6.5	5.7	7.4	46.7	5.6	19.1	104.4	18.2	6.0	4.3	11.3	52.1	52.0	6.1	37.4	571.4	124.0	2.4	93.5	915.7	-5.0	1,702.0	**4,493.1**
13.7	4.9	0.2	0.2	0.3	2.2	3.8	1.7	27.0	20.8	72.8	5.1	1.0	0.5	3.0	2.1	0.2	3.0	0.3	4.1	50.9	1.2	0.3	26.8	175.1	-5.2	249.0	**2,540.9**
1.1	0.6	0.2	0.3	0.4	3.5	0.7	19.7	3.2	1.3	70.5	26.7	1.8	0.9	5.0	3.5	0.8	4.6	6.4	0.8	28.5	0.9	1.1	37.3	1,440.2	-1.6	1,506.4	**4,330.6**
3.2	1.5	2.6	2.7	4.6	37.1	9.9	23.5	173.3	12.0	40.7	20.4	38.5	13.5	6.1	11.5	6.8	1.7	6.8	1.4	127.7	4.7	45.9	227.7	574.1	-3.7	976.3	**5,665.9**
27.6	22.3	22.5	23.1	39.7	316.8	190.6	13.1	33.0	48.9	65.8	104.9	156.0	82.4	26.1	88.2	73.6	10.9	71.3	22.1	857.3	4.4	76.2	2,188.9	3,261.8	-54.4	6,334.2	**10,232.6**
0.2	0.4	0.1	0.1	0.1	0.8	0.4	1.1	67.4	2.6	1.7	3.3	3.1	3.8	2.3	1.9	0.9	1.2	2.2	5.5	495.0	8.9	46.6	455.8	383.4	-0.2	1,389.6	**1,766.6**
6.8	3.4	10.6	0.6	6.7	53.2	54.7	41.7	6.1	9.3	64.9	87.2	84.8	101.7	31.7	107.7	37.7	54.5	62.7	20.8	2,474.9	48.6	0.0	261.2	25.7	-	2,810.4	**10,225.5**
0.0	0.0	0.2	0.2	0.3	2.5	-	0.0	271.7	-	0.4	0.0	2.5	49.6	0.0	0.0	1.3	2.2	0.0	-	1.5	0.7	-	19.0	0.2	-0.0	21.5	**730.2**
0.7	0.1	0.1	0.1	0.1	1.1	0.6	26.3	3.8	0.3	0.5	11.8	54.3	116.6	6.4	4.2	21.1	44.8	0.6	66.4	11.6	1.0	0.0	1.2	0.0	-	13.9	**789.3**
14.4	10.0	4.5	4.6	7.9	63.2	112.5	82.7	1,902.9	11.6	40.5	34.7	528.8	1,007.8	30.3	194.4	45.5	135.0	155.0	89.0	207.8	7.8	5.9	17,629.2	198.7	-0.3	18,049.1	**31,260.6**
376.0	110.8	16.0	18.2	29.4	234.8	148.5	174.4	365.5	104.5	116.9	486.3	231.3	50.1	54.4	75.7	188.0	119.7	65.2	6.1	18,843.7	679.6	537.1	4,132.0	8,982.4	-3.3	33,171.5	**44,086.7**
4.6	0.9	4.0	4.1	7.0	55.8	2.9	17.3	3.9	3.3	20.2	32.9	171.2	10.8	31.3	53.1	29.7	86.4	31.0	21.1	4,347.1	81.1	4.5	9.6	2,072.0	-0.0	6,514.4	**7,285.0**
1,430.1	7.8	9.7	10.0	17.1	136.7	52.7	19.7	3.1	23.5	22.0	94.6	35.7	18.2	3.3	8.5	3.6	12.7	29.5	34.8	179.2	36.9	0.0	21.5	88.6	-	326.3	**6,166.5**
14.3	12.3	0.9	0.9	1.5	12.0	1.0	12.0	0.3	2.7	24.3	31.0	15.9	0.6	17.6	20.8	5.8	22.0	18.9	18.1	354.7	210.9	0.5	5.5	141.9	-	713.4	**979.7**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	170.9	9.3	-	9.0	-	-	189.2	**616.5**
121.0	21.7	74.2	-	1.3	14.0	24.6	6.6	-	-	-	-	-	-	-	-	-	-	-	-	79.5	7.7	-	26.7	-	-	113.9	**655.8**
14.0	-	3.4	5.2	26.3	207.6	10.6	10.9	1.3	5.8	19.5	38.6	20.5	2.3	0.6	4.3	1.3	2.6	9.2	4.3	122.8	9.1	0.5	11.9	402.8	-1.4	545.7	**1,162.5**
140.0	5.3	45.3	41.3	208.1	1,642.1	89.7	87.8	10.0	46.1	154.1	304.8	161.9	18.3	4.7	33.9	10.2	20.3	72.4	33.8	991.7	24.6	3.6	99.2	3,177.4	-10.7	4,285.8	**9,312.9**
253.3	20.9	8.0	8.2	14.2	113.0	1,635.6	328.1	36.3	36.6	252.4	461.9	262.2	81.7	16.0	102.6	45.6	97.6	176.9	90.3	2,371.0	65.0	-0.9	211.6	623.3	-0.6	3,269.3	**9,198.5**
155.3	49.0	40.9	42.1	72.4	577.8	167.1	6,701.9	1,250.0	268.0	414.1	1,085.5	575.4	126.6	26.1	148.1	121.6	322.7	407.0	340.6	3,460.4	88.0	0.8	237.8	538.4	-1.9	4,323.5	**22,598.3**
48.2	8.1	6.3	6.4	11.0	88.2	56.9	222.1	1,258.8	39.1	121.0	300.0	296.5	15.1	6.6	36.3	16.3	147.1	183.9	62.7	19,724.7	552.2	0.1	1,168.9	261.2	-0.0	21,707.1	**26,470.5**
64.4	25.7	41.0	42.1	72.4	577.9	19.2	68.8	31.2	179.6	94.1	136.0	98.8	84.5	2.3	30.2	26.7	44.1	56.8	38.4	157.3	45.6	2.2	49.2	437.3	-1.0	690.5	**3,053.3**
8.5	10.9	8.6	8.8	15.2	121.2	155.4	865.3	17.3	47.1	1,537.6	643.1	464.9	271.8	9.1	26.9	86.2	131.3	246.6	90.8	169.2	530.3	3.9	1,536.0	431.0	-5.6	2,664.7	**10,909.4**
137.7	52.1	29.2	30.1	51.6	412.2	559.6	1,346.9	312.4	240.1	852.5	2,777.1	1,022.8	264.6	88.5	304.4	232.6	501.4	773.1	586.2	561.6	240.7	0.7	330.2	749.5	-5.2	1,877.4	**21,212.7**
18.1	3.2	1.5	1.5	2.6	20.6	10.9	89.2	40.2	9.3	34.5	58.4	101.4	7.0	22.7	8.7	24.1	52.8	26.1	22.9	258.3	10,923.3	-0.5	69.0	116.4	-	11,366.4	**12,372.4**
10.8	0.3	0.2	0.2	0.4	3.0	1.7	12.1	7.0	3.1	16.6	73.1	16.0	101.1	40.9	5.8	7.1	13.6	250.8	14.2	201.5	4,486.2	-	17.4	85.4	-	4,790.6	**5,503.8**
1.3	0.7	0.6	0.6	1.1	8.4	4.8	6.2	5.6	1.7	8.7	17.2	20.8	6.1	11.8	23.8	7.3	7.1	18.0	16.6	161.2	3,914.7	0.3	4.3	127.2	-	4,207.7	**4,450.3**
0.8	0.6	0.3	0.3	0.6	4.6	8.6	8.3	3.2	2.2	20.6	72.8	41.2	1.4	8.7	66.8	6.2	27.4	4.5	46.5	1,300.1	2,111.7	0.8	39.9	939.7	-0.0	4,392.2	**4,779.9**
1.1	0.0	0.1	0.1	0.1	0.9	0.5	0.9	0.2	0.2	5.4	2.8	16.9	0.1	0.1	1.2	2.1	7.3	0.5	1.0	637.7	6,289.9	0.0	12.0	21.5	-	6,961.2	**7,009.8**
3.0	1.1	0.8	0.8	1.4	11.0	1.9	20.7	5.9	5.1	17.3	24.5	86.9	20.2	9.7	12.6	182.5	789.4	44.2	7.4	2,895.8	4,231.8	0.4	25.0	69.1	-0.0	7,222.1	**8,640.5**
7.0	2.6	3.3	3.4	5.9	47.1	136.7	65.9	17.0	23.5	46.1	841.7	56.1	93.6	42.6	24.8	5.6	23.1	1,030.5	54.1	4,468.0	371.7	1.1	45.2	846.3	-0.0	5,732.3	**9,194.6**
30.7	1.8	0.7	0.7	1.2	9.6	9.0	32.0	83.2	5.2	33.8	208.0	64.6	156.4	21.6	29.8	59.3	61.8	78.3	300.7	3,013.2	109.8	1.0	14.8	128.8	-0.0	3,267.7	**4,949.8**
140.1	86.5	48.6	59.6	90.8	729.6	440.9	217.3	416.8	253.2	457.6	1,222.2	506.6	99.4	132.5	211.4	588.3	467.1	800.6	338.0	16,231.9	400.2	386.3	8,553.7	-	5,102.2	30,674.3	**59,453.8**
1,179.9	339.6	143.1	115.4	229.4	1,856.9	1,292.1	4,195.9	712.2	347.3	4,024.7	5,736.9	6,050.7	1,599.9	3,409.2	2,679.5	4,541.5	3,256.4	1,815.0	1,709.6	-	-	-	-	-	-	-	**81,955.4**
927.7	222.3	83.1	119.0	144.6	1,166.6	3,795.2	6,098.9	16,045.8	1,137.0	1,884.2	4,743.2	695.2	957.6	304.5	299.1	349.6	1,930.5	2,155.1	672.7	-	-	-	-	-	-	-	**77,978.0**
648.1	-119.8	-28.5	-	14.9	115.5	82.9	1,569.5	3,021.7	84.7	56.7	78.4	156.7	32.5	20.1	38.3	7.1	19.9	371.7	53.4	9,878.1	860.8	2.4	1,022.9	1,017.5	-	12,781.7	**24,680.2**
6,166.5	**979.7**	**616.5**	**655.8**	**1,162.5**	**9,312.9**	**9,198.5**	**22,598.3**	**26,470.5**	**3,053.3**	**10,909.4**	**21,212.7**	**12,372.4**	**5,503.8**	**4,450.3**	**4,779.9**	**7,009.8**	**8,640.5**	**9,194.6**	**4,949.8**	**108,360.9**	**36,748.7**	**1,328.4**	**40,094.1**	**57,535.2**	**-**	**244,067.4**	**626,284.7**

APPENDIX B – REGIONAL I-O DATA

B.1. Northland Regional Table

Table B.1: 2009 I-O table of Northland (Million NZD)

Industries		1 HFRG	2 SBLC	3 DAIF	4 OTHF	5 SAHF	6 FOLO	7 FISH	8 COAL	9 FUEL	10 OMIN	11 MEAT	12 DAIR	13 OFOD	14 BEVT	15 TCFL	16 WOOD	17 PAPR	18 PPRM	19 CHEM	20 RBPL	21 NMMP	22 BASM	23 FABM	24 MAEQ	25 OMFG	26 ELEC	27 WATS	28 WAST	29 CONS	30 TRDE	31 ACCR
1	HFRG	1.3	3.9	11.6	0.2	1.7	2.7	0.0	0.0	0.0	0.0	1.9	0.0	2.6	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	2.7	6.1
2	SBLC	1.7	57.3	23.1	1.8	3.4	2.8	0.0	0.0	0.0	0.0	55.0	0.0	1.5	0.7	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0	0.7
3	DAIF	0.8	9.1	7.9	0.5	1.3	0.4	0.0	0.0	0.0	0.0	0.0	103.2	0.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.4
4	OTHF	1.4	5.8	4.6	1.8	2.4	0.4	0.0	0.0	0.0	0.0	6.5	0.4	0.6	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.3
5	SAHF	6.1	16.9	11.7	1.1	9.0	24.1	0.1	0.0	0.0	0.0	2.9	0.0	0.2	0.1	0.0	0.1	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.8	0.0
6	FOLO	0.3	1.7	3.1	0.1	0.1	89.9	0.1	0.0	0.0	0.0	0.7	0.0	0.0	0.1	0.0	40.4	0.2	0.0	0.6	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	1.1	3.2	0.0
7	FISH	0.0	0.0	0.0	0.0	0.1	0.1	9.1	0.0	0.0	0.0	0.0	0.0	9.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.1
8	COAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	FUEL	0.8	6.0	5.8	1.1	6.5	17.5	3.2	2.0	269.5	2.4	0.8	1.0	1.7	0.5	0.2	3.4	0.1	1.9	70.2	0.5	1.6	0.0	0.9	2.3	0.6	46.3	0.0	0.3	9.3	11.6	1.2
10	OMIN	0.4	2.1	2.9	0.2	0.1	0.3	0.0	0.7	9.8	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.2	6.3	0.0	0.3	0.1	0.2	0.0	0.0	0.1	2.9	0.4	0.0
11	MEAT	0.1	0.9	3.9	0.3	0.2	0.1	0.2	0.1	0.0	0.1	6.5	0.0	0.5	0.0	0.9	0.0	0.0	0.4	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	15.9
12	DAIR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	1.4	0.1	0.1	0.0	0.5	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	3.5	1.8
13	OFOD	0.1	0.9	3.5	0.3	0.2	0.1	1.2	0.0	0.0	0.0	0.3	0.2	5.9	0.5	0.0	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	1.5	5.2
14	BEVT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	3.9
15	TCFL	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.4	1.4	0.0
16	WOOD	0.0	0.2	0.2	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	23.5	0.1	0.1	0.1	0.0	1.2	0.0	0.2	0.3	4.2	0.0	0.0	0.0	36.1	1.4	0.0
17	PAPR	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.0
18	PPRM	0.1	0.3	0.1	0.1	0.4	0.3	0.0	0.0	0.3	0.0	0.2	0.1	0.5	0.3	0.0	0.6	0.0	1.0	0.7	0.2	0.2	0.0	0.2	0.5	0.1	0.5	0.0	0.0	0.7	7.5	0.6
19	CHEM	4.0	21.7	35.0	1.8	5.1	8.7	0.2	0.0	2.3	0.1	0.5	0.3	0.4	0.1	0.0	5.8	0.1	0.1	128.8	4.3	0.5	0.0	0.8	1.5	0.3	0.4	0.1	0.0	1.0	4.5	0.1
20	RBPL	0.7	1.5	2.7	0.3	0.2	1.1	0.0	0.0	0.2	0.0	0.8	0.6	1.1	0.1	0.0	0.7	0.0	0.2	1.7	1.1	0.1	0.0	0.3	0.8	0.2	0.0	0.0	0.0	2.4	3.0	0.4
21	NMMP	0.1	0.5	0.7	0.1	0.1	0.2	0.0	0.1	2.2	0.2	0.0	0.0	0.1	0.9	0.0	0.2	0.0	0.0	0.1	0.0	14.4	0.0	0.5	3.2	0.2	0.0	0.2	0.1	30.6	1.7	0.1
22	BASM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	FABM	0.5	2.4	3.2	0.2	0.7	3.2	0.5	0.1	1.1	0.1	0.6	0.5	1.1	2.8	0.1	1.8	0.0	0.2	3.7	0.5	1.2	0.0	12.8	16.6	1.1	1.3	0.1	0.1	11.3	10.1	1.6
24	MAEQ	0.3	1.6	2.9	0.2	3.8	1.4	3.9	0.0	6.2	0.1	0.2	0.1	0.3	0.3	0.0	0.4	0.0	0.2	2.1	0.1	0.2	0.0	0.7	12.5	0.1	5.4	0.0	0.1	11.7	8.1	1.1
25	OMFG	0.0	0.1	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.4	0.6	0.0	0.0	0.0	1.6	0.8	0.5
26	ELEC	2.7	2.4	6.5	0.6	0.3	1.3	0.4	0.1	3.6	0.6	1.8	1.0	1.2	0.3	0.1	4.1	0.3	0.2	8.8	0.4	1.8	0.0	0.6	1.2	0.2	294.1	1.2	0.1	1.3	9.2	5.7
27	WATS	0.0	0.0	0.0	0.0	0.4	0.0	0.2	0.0	0.1	0.0	0.6	0.2	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	7.6	0.0	0.1	0.9	0.1
28	WAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.2	0.0	0.0	1.4	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.1	6.1	1.4	0.1	0.0
29	CONS	0.9	3.9	5.5	0.4	0.4	3.6	0.6	1.1	17.3	1.8	0.0	0.0	0.1	0.1	0.0	0.7	0.0	0.0	0.3	0.1	1.9	0.0	0.3	4.8	0.1	41.6	0.0	0.3	166.8	2.0	0.1
30	TRDE	4.1	18.2	28.2	1.9	7.8	13.7	2.9	0.3	4.3	0.4	2.6	1.9	6.0	2.4	0.7	4.9	0.1	0.9	12.9	0.5	1.4	0.0	2.3	9.3	0.9	3.7	0.0	0.5	23.5	50.2	16.3
31	ACCR	0.1	0.2	0.3	0.0	0.2	0.4	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.6	1.6	0.5
32	RDFR	2.1	5.2	2.7	0.8	2.3	55.2	0.8	0.2	1.2	0.3	3.0	3.1	3.8	0.9	0.2	6.2	0.1	0.6	29.8	0.8	3.2	0.0	0.9	2.2	0.6	0.2	0.0	0.2	2.0	23.4	0.1
33	RDPS	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1
34	RFRT	0.0	0.1	0.1	0.0	0.0	0.6	0.0	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.9	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0
35	WFRT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36	OFRT	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
37	OTTR	0.2	0.5	0.4	0.1	0.6	4.2	1.2	0.1	1.3	0.1	1.0	0.1	0.9	0.1	0.0	1.0	0.1	0.1	4.1	0.2	0.2	0.0	0.1	0.7	0.1	0.3	0.0	0.0	0.4	9.3	0.1
38	COMM	0.4	1.1	0.8	0.3	0.4	1.1	0.1	0.0	0.3	0.0	0.1	0.1	0.2	0.1	0.0	0.3	0.0	0.1	1.1	0.1	0.2	0.0	0.2	0.6	0.1	0.6	0.0	0.0	1.4	5.1	0.4
39	FIIN	3.4	6.5	3.9	1.0	3.7	7.9	3.0	0.1	2.1	0.1	0.5	0.4	1.1	1.2	0.1	2.0	0.0	0.4	4.5	0.4	0.7	0.0	0.6	1.7	0.3	5.3	0.0	0.1	3.1	25.5	2.8
40	HOUS	1.1	3.2	5.1	0.1	0.6	1.1	0.1	0.0	0.5	0.0	0.3	0.2	0.4	0.2	0.1	0.7	0.0	0.2	1.4	0.2	0.3	0.0	0.6	1.2	0.3	3.9	0.0	0.1	2.5	20.9	2.4
41	EHOP	0.7	1.1	0.9	0.1	0.9	2.5	1.0	0.1	0.4	0.1	0.1	0.1	0.4	0.1	0.0	0.6	0.0	0.1	2.0	0.1	0.2	0.0	0.1	0.5	0.1	1.4	0.1	0.1	0.7	2.6	0.3
42	SRCS	0.6	1.6	1.1	0.1	1.4	2.5	0.6	0.1	6.0	0.1	0.6	0.4	0.5	0.5	0.0	0.5	0.1	0.2	4.4	0.2	0.6	0.0	0.5	2.2	0.1	24.4	0.0	0.0	3.2	8.4	0.7
43	OBUS	2.9	8.3	5.6	1.9	2.8	14.8	1.6	0.1	3.5	0.2	1.5	1.1	3.0	2.3	0.3	4.0	0.0	1.1	8.1	1.2	2.0	0.0	1.4	4.5	0.7	9.9	0.2	0.2	11.2	48.4	6.4
44	GOVC	0.3	1.9	1.6	0.1	0.2	1.3	0.2	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	1.0	0.0	0.0	0.3	0.0	0.2	0.0	0.1	0.2	0.1	0.3	0.0	0.0	0.6	2.3	0.3
45	GOVL	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.3	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	1.4	0.0	0.0	0.1	0.0	0.0	0.0	0.3	0.2	0.2	0.0
46	SCHL	0.0	0.2	0.2	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.5	0.0	0.0	0.1	0.4	0.1
47	OEDU	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.1	0.2	0.0
48	HOSP	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
49	OHCS	0.1	1.4	3.8	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.2	0.0	0.0	0.1	0.5	0.0
50	CULT	0.4	1.2	0.8	0.2	0.7	0.3	0.0	0.0	0.1	0.0	0.3	0.2	0.5	0.3	0.0	0.3	0.0	0.3	0.8	0.3	0.4	0.0	0.1	0.5	0.1	0.6	0.0	0.0	0.4	7.1	0.9
51	PERS	0.1	0.2	0.6	0.0	0.7	1.9	0.4	0.0	0.1	0.0	1.1	0.8	0.2	0.2	0.1	0.1	0.0	0.3	0.5	0.1	0.1	0.0	0.2	0.3	0.0	2.2	0.0	0.0	1.0	2.3	0.2
	Other Imports	8.8	36.9	22.9	3.6	9.3	21.4	12.5	0.1	0.0	0.4	5.2	4.7	19.2	6.0	2.4	9.1	0.4	6.6	99.0	12.0	8.4	0.0	12.4	36.4	5.6	4.4	0.2	0.1	157.8	55.2	55.2
	Compensation of Employees	30.2	44.0	104.1	6.0	19.8	33.8	4.0	0.0	46.7	7.6	29.9	29.3	7.2	1.7	3.8	47.7	0.4	11.4	5.2	5.7	29.4	0.0	25.0	52.0	7.9	35.0	2.2	7.4	150.6	290.6	11.3
	Depreciation + Op Surplus	22.3	33.3	48.8	3.5	61.7	98.3	17.1	4.2	177.6	0.5	-6.6	5.3	24.0	11.5	0.5	7.5	0.9	3.6	141.4	6.9	9.0	0.0	1.5	26.3	4.9	184.9	10.0	3.2	72.5	78.0	59.6
	Net Indirect Taxes	3.2	26.0	9.6	1.4	3.0	4.1	-0.1	0.6	115.9	0.0	-0.3	0.2	0.9	26.6	0.0	0.3	0.0	0.2	4.3	0.4	0.7	0.0	0.1	0.5	0.2	3.5	0.1	0.1	6.4	5.5	39.2
	Domestic Import	13.21	31.14	35.07	5.12	14.50	45.72	9.91	1.22	22.10	1.64	9.79	4.68	20.94	7.33	1.23	15.29	0.85	5.57	55.82	6.01	8.32	0.00	14.78	26.12	3.67	54.90	0.56	0.58	30.46	127.48	5.5
	Gross Output	**117.0**	**361.5**	**411.9**	**37.5**	**167.4**	**472.2**	**75.3**	**11.6**	**695.8**	**19.1**	**128.8**	**162.0**	**117.2**	**71.8**	**12.0**	**186.6**	**3.8**	**36.4**	**597.7**	**43.5**	**96.7**	**0.0**	**79.0**	**210.8**	**33.9**	**726.8**	**22.8**	**20.3**	**748.3**	**855.5**	**39.69**

Table B.1: 2009 I-O Table of Northland (Million NZD) – Continuation (right hand side)

32 RDFR	33 RDPS	34 RFRT	35 WFRT	36 OFRT	37 OTTR	38 COMM	39 FIIN	40 HOUS	41 EHOP	42 SRCS	43 OBUS	44 GOVC	45 GOVL	46 SCHL	47 OEDU	48 HOSP	49 OHCS	50 CULT	51 PERS	Private Consumption	Government Consumption	Stock Change	Gross Investment	Exports	Import Adjustments	Final Demand	Gross Output
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.1	0.1	0.0	0.0	0.0	1.4	0.0	0.0	0.0	11.1	0.3	-0.1	0.4	51.4	-0.0	14.8	**117.0**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.2	0.0	1.7	0.0	0.1	0.2	16.4	-0.0	181.4	**361.5**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.4	0.2	0.0	0.2	2.1	-	282.9	**411.9**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.1	0.1	0.0	4.0	0.3	0.0	0.2	5.3	-0.0	1.8	**37.5**
0.1	0.0	0.0	-	0.0	0.2	0.0	0.0	0.0	0.3	0.0	1.8	0.4	0.0	0.0	0.0	0.0	0.3	0.2	0.1	0.6	0.5	0.0	15.1	4.6	-0.0	69.1	**167.4**
0.2	0.0	0.0	-	0.0	0.1	0.0	0.0	0.1	0.0	0.0	3.8	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.1	40.5	5.1	106.1	-0.0	172.4	**472.2**
0.0	0.0	0.0	-	0.0	0.1	0.0	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.7	0.0	11.5	-0.0	43.1	**75.3**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.0	-	0.4	1.9	-	9.0	**11.6**
4.7	0.9	0.1	-	0.2	8.5	0.2	0.2	0.7	0.3	0.9	0.7	3.4	2.2	0.3	0.8	1.4	2.1	0.1	0.4	41.2	1.5	-2.0	78.0	173.9	-361.4	267.5	**695.8**
0.2	0.0	0.0	-	-	0.0	0.0	0.0	0.1	0.0	0.0	0.0	-	-	-	-	-	-	-	-	0.1	0.1	0.0	0.3	4.2	-0.2	-15.4	**19.1**
-	-	-	-	0.0	0.0	-	-	-	-	-	-	0.2	-	0.0	0.2	0.2	0.0	0.1	0.0	58.0	2.0	-	0.1	71.5	-0.0	-34.6	**128.8**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	31.3	0.8	-2.5	0.1	140.7	-	-16.7	**162.0**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.1	0.0	65.2	0.6	-0.1	0.3	42.0	-0.0	-12.3	**117.2**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	72.8	2.0	0.2	0.0	18.8	-0.0	-26.5	**71.8**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.9	0.3	0.2	0.1	5.2	-0.0	-8.4	**12.0**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.9	0.0	1.3	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.5	0.9	0.3	1.3	1.5	62.1	-0.0	47.5	**186.6**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.1	0.3	0.0	0.0	1.5	-0.0	-7.1	**3.8**
0.1	0.0	0.0	-	0.0	0.4	0.5	0.9	0.7	0.3	0.8	4.3	0.8	0.1	0.3	0.5	0.3	0.8	0.4	1.0	12.6	0.3	0.1	0.2	2.7	-0.0	-7.6	**36.4**
0.4	0.1	0.0	-	0.0	0.6	0.0	0.0	0.1	0.1	0.1	0.3	0.2	0.1	0.1	0.1	0.9	0.9	0.0	0.4	2.5	0.1	0.7	0.7	79.2	-0.6	282.0	**597.7**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.5	0.1	0.1	0.5	0.1	0.1	0.0	0.1	0.6	0.6	0.0	0.3	14.3	4.5	0.0	0.9	8.9	-0.0	-8.5	**43.5**
0.2	0.1	0.0	-	0.0	0.0	0.0	0.0	0.9	0.6	1.1	0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.1	1.3	0.0	0.0	1.0	6.7	-0.2	28.0	**96.7**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7	0.0	-	-	-	-	-0.7	**-**
0.0	0.0	0.0	-	0.0	0.5	0.1	0.3	4.9	0.3	0.5	0.3	0.7	0.4	0.2	0.3	0.2	0.1	0.1	0.0	3.2	0.2	0.6	3.2	8.0	-0.1	-24.4	**79.0**
0.4	0.3	0.1	-	0.1	4.6	1.8	0.1	0.9	1.2	0.8	1.3	2.9	2.6	0.6	2.2	2.3	0.3	0.6	0.5	21.4	0.2	1.6	45.1	67.2	-1.1	-11.6	**210.8**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	1.7	0.1	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	12.4	0.3	0.9	8.7	7.4	-0.0	-3.2	**33.9**
0.1	0.1	0.0	-	0.0	0.9	0.6	0.5	0.2	0.3	0.9	1.3	1.8	3.7	0.9	3.0	1.4	2.0	0.6	0.5	61.8	1.8	0.0	18.6	1.8	-	272.0	**726.8**
0.0	0.0	0.0	-	0.0	0.0	-	0.0	8.6	-	0.0	0.0	0.1	1.8	0.0	0.0	0.0	0.1	0.0	-	0.0	0.0	-	0.6	0.0	-0.0	1.0	**22.8**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.3	0.1	0.0	0.0	0.2	1.2	4.2	0.2	0.1	0.8	1.6	0.0	1.7	0.3	0.0	0.0	0.0	0.0	-	-1.9	**20.3**
0.2	0.2	0.0	-	0.0	1.0	1.2	1.0	60.4	0.3	0.6	0.5	11.3	36.2	0.9	5.5	1.6	4.9	1.5	2.3	5.2	0.3	0.1	422.0	4.8	-0.0	-68.7	**748.3**
6.2	1.8	0.1	-	0.1	3.9	1.6	2.2	11.6	3.0	1.7	7.1	4.9	1.8	1.5	2.1	6.8	4.3	0.6	0.2	470.4	24.5	10.4	80.2	174.3	-0.1	-188.8	**855.5**
0.1	0.0	0.0	-	0.0	0.9	0.0	0.2	0.1	0.1	0.3	0.5	3.6	0.4	0.9	1.5	1.1	3.1	0.3	0.5	108.5	2.9	0.1	0.3	66.2	-0.0	36.0	**232.8**
23.6	0.1	0.0	-	0.1	2.3	0.6	0.2	0.1	0.7	0.3	1.4	0.8	0.7	0.1	0.2	0.1	0.5	0.3	0.9	4.5	1.3	0.0	0.4	1.5	-	-91.1	**101.7**
0.2	0.2	0.0	-	0.0	0.2	0.0	0.1	0.0	0.1	0.4	0.5	0.3	0.0	0.5	0.6	0.2	0.8	0.2	0.5	8.9	7.6	0.0	0.1	2.3	-	-8.6	**16.2**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.3	0.3	-	0.0	-	-	-4.3	**2.8**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.0	0.3	-	-	-	-	-2.3	**-**
0.0	-	0.0	-	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1	0.3	0.0	0.0	1.6	-0.0	-2.2	**4.6**
1.2	0.0	0.1	-	0.4	13.9	0.5	0.6	0.2	0.7	1.2	2.3	1.8	0.3	0.1	0.5	0.2	0.4	0.4	0.4	24.8	0.9	0.1	1.6	52.4	-0.2	21.4	**153.6**
1.3	0.1	0.0	-	0.0	0.6	5.2	1.2	0.3	0.3	1.1	2.0	1.7	0.9	0.1	0.9	0.5	1.1	0.5	0.7	59.2	2.3	-0.0	2.2	6.6	-0.0	-7.3	**97.2**
1.3	0.4	0.1	-	0.1	5.0	0.9	43.7	20.8	4.0	3.2	8.3	6.4	2.4	0.4	2.2	2.3	6.1	2.1	4.6	86.4	3.2	0.0	3.0	6.7	-0.0	-14.5	**281.7**
0.8	0.1	0.0	-	0.0	1.5	0.6	2.8	40.0	1.1	1.8	4.4	6.3	0.5	0.2	1.0	0.6	5.3	1.8	1.6	492.4	19.9	0.0	37.1	8.3	-0.0	164.8	**840.9**
0.8	0.3	0.1	-	0.2	7.1	0.2	0.6	0.7	3.9	1.0	1.5	1.6	2.3	0.0	0.6	0.7	1.2	0.4	0.7	3.9	1.6	0.1	1.4	12.5	-0.0	26.3	**87.3**
0.1	0.1	0.0	-	0.0	0.9	0.8	5.0	0.3	0.6	10.4	4.4	4.6	4.5	0.1	0.4	1.5	2.2	1.1	1.1	4.2	19.1	0.1	22.4	6.3	-0.1	7.5	**159.4**
1.4	0.5	0.1	-	0.1	4.2	3.7	10.4	6.2	4.3	7.7	25.2	13.5	5.9	1.6	5.4	5.2	11.3	4.7	9.4	14.0	8.7	0.0	4.8	10.9	-0.1	1.4	**309.9**
0.2	0.0	0.0	-	0.0	0.2	0.1	0.8	0.9	0.2	0.4	0.6	1.6	0.2	0.5	0.2	0.6	1.4	0.2	0.4	6.4	394.4	-0.0	1.5	2.5	-	-161.0	**263.7**
0.2	0.0	0.0	-	0.0	0.0	0.0	0.2	0.2	0.1	0.2	1.1	0.3	3.6	1.2	0.2	0.3	0.5	2.4	0.4	5.0	162.0	-	0.6	3.1	-	12.4	**197.7**
0.0	0.0	0.0	-	0.0	0.1	0.1	0.1	0.2	0.0	0.1	0.3	0.4	0.2	0.3	0.7	0.3	0.3	0.2	0.4	4.0	141.3	0.0	0.1	3.6	-	-29.1	**126.1**
0.0	0.0	0.0	-	0.0	0.0	0.1	0.1	0.1	0.0	0.2	0.6	0.5	0.0	0.1	1.1	0.1	0.6	0.0	0.7	32.5	76.2	0.0	1.1	26.6	-0.0	-6.7	**135.4**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.4	0.0	0.0	0.0	0.1	0.3	0.0	0.0	15.9	227.1	0.0	0.4	0.8	-	8.5	**253.9**
0.0	0.0	0.0	-	0.0	0.2	0.0	0.3	0.2	0.1	0.3	0.4	1.9	0.7	0.3	0.4	6.6	28.6	0.4	0.2	72.3	152.8	0.0	0.9	2.5	-0.0	36.8	**312.9**
0.1	0.0	0.0	-	0.0	0.6	1.1	0.6	0.4	0.5	0.5	9.5	0.9	2.6	0.9	0.5	0.2	0.6	7.8	1.1	111.5	13.4	0.0	0.4	8.2	-0.0	-89.1	**89.6**
0.5	0.0	0.0	-	0.0	0.2	0.1	0.4	2.6	0.1	0.5	3.0	1.4	5.6	0.6	0.8	2.1	2.2	0.8	7.7	75.2	4.0	0.0	0.4	3.3	-0.0	1.9	**127.2**
2.3	1.4	0.2	-	0.4	12.0	4.7	2.7	13.2	7.2	6.7	17.9	10.8	3.6	3.8	6.0	21.3	16.9	7.8	8.7	405.2	10.8	10.4	230.9	-	364.1	-	**1,741.2**
42.3	11.2	0.5	-	0.6	21.7	8.0	52.4	26.1	6.2	41.3	79.3	113.7	56.5	125.5	40.1	143.6	126.3	32.7	47.6	-	-	-	-	-	-	-	**2,073.7**
1.8	-8.4	0.7	-	0.8	27.4	45.6	76.0	506.8	36.0	44.5	73.7	27.3	35.3	-18.5	40.2	33.1	61.7	8.2	13.9	-	-	-	-	-	-	-	**2,097.6**
1.3	4.5	-0.2	-	0.1	2.7	1.0	19.5	95.4	2.7	1.3	1.2	6.2	1.2	-1.2	5.2	0.7	0.6	1.4	1.1	246.6	23.2	0.1	27.6	27.5	-	-	**688.6**
9.1	1.8	0.7	-	0.9	30.2	18.1	57.7	31.7	10.8	26.8	49.1	29.1	16.6	3.3	11.3	13.2	22.5	11.1	16.3	-	-	-	-	-	-	-1,137.0	**-163.0**
101.7	**16.2**	**2.8**	**-**	**4.6**	**153.6**	**97.2**	**281.7**	**840.9**	**87.3**	**159.4**	**309.9**	**263.7**	**197.7**	**126.1**	**135.4**	**253.9**	**312.9**	**89.6**	**127.2**	**2,704.9**	**1,315.4**	**63.8**	**1,020.7**	**1,333.5**	**-**	**-**	**16,755.7**

B.2. Auckland Regional Table

Table B.2: 2009 I-O table of Auckland (Million NZD)

Industries		1 HFRG	2 SBLC	3 DAIF	4 OTHF	5 SAHF	6 FOLO	7 FISH	8 COAL	9 FUEL	10 OMIN	11 MEAT	12 DAIR	13 OFOD	14 BEVT	15 TCFL	16 WOOD	17 PAPR	18 PPRM	19 CHEM	20 RBPL	21 NMMP	22 BASM	23 FABM	24 MAEQ	25 OMFG	26 ELEC	27 WATS	28 WAST	29 CONS	30 TRDE	31 ACCR
1	HFRG	1.3	0.8	2.5	0.2	1.9	0.6	0.0	0.0	0.0	0.0	12.1	-	16.0	13.8	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.3	21.8	20.7
2	SBLC	0.3	2.0	0.8	0.2	0.6	0.1	0.0	0.0	0.0	0.0	55.9	-	1.6	0.7	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	15.7	0.4
3	DAIF	0.1	0.3	0.3	0.1	0.2	0.0	0.0	0.0	0.0	0.0	-	102.5	0.4	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	1.4	0.2
4	OTHF	0.8	0.7	0.5	0.7	1.4	0.0	0.0	0.0	0.0	0.0	22.1	1.5	1.9	0.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	2.7	0.6
5	SAHF	3.2	1.7	1.2	0.4	4.7	2.5	0.0	0.0	0.0	0.0	8.6	-	0.5	0.2	0.1	0.1	0.0	0.0	0.5	0.1	0.1	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.3	3.0	0.1
6	FOLO	0.2	0.2	0.3	0.0	0.1	8.2	0.0	0.0	0.0	0.0	1.8	-	0.1	0.2	0.2	32.8	7.1	0.2	0.4	0.0	0.1	0.0	0.2	0.4	0.3	0.0	0.0	0.0	1.8	10.8	0.0
7	FISH	0.0	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.0	0.0	0.0	-	24.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	3.2	0.1
8	COAL	-	-	0.0	-	-	-	-	0.0	0.1	0.0	0.1	0.2	0.1	0.0	0.0	0.1	0.0	0.0	-	0.0	0.4	3.5	-	-	-	1.0	-	-	-	0.1	0.0
9	FUEL	0.7	1.1	1.1	0.8	6.3	3.4	2.4	2.0	366.1	2.4	4.4	5.4	9.5	2.8	4.6	5.9	7.6	30.8	97.9	8.7	6.6	6.4	8.4	15.7	5.2	42.8	0.0	1.5	34.6	83.9	3.6
10	OMIN	0.3	0.4	0.5	0.1	0.1	0.0	0.0	0.7	12.6	1.7	-	-	-	-	-	-	-	-	1.2	2.6	24.7	15.2	3.0	0.5	1.4	-	0.0	0.6	10.3	2.5	-
11	MEAT	0.1	0.2	0.7	0.2	0.1	0.0	0.2	0.1	0.0	0.1	32.8	-	2.7	-	17.8	-	-	5.2	-	7.8	-	-	-	-	-	-	-	-	-	1.8	43.2
12	DAIR	-	-	-	-	-	-	-	-	0.1	-	-	8.3	0.5	0.3	-	0.9	0.4	0.3	0.4	0.8	0.3	0.0	0.3	1.0	0.4	0.0	0.0	0.0	0.0	26.5	5.6
13	OFOD	1.0	1.5	6.2	1.9	1.6	0.2	8.5	0.0	0.3	0.1	14.4	10.6	304.3	28.3	1.2	2.3	1.8	6.0	2.6	7.5	1.0	0.5	2.4	4.4	1.4	0.1	0.2	0.0	0.6	99.9	147.0
14	BEVT	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	1.8	22.8	0.1	0.1	0.1	0.6	0.1	0.3	0.1	0.1	0.3	0.5	0.1	0.0	0.0	0.0	0.1	20.8	174.9
15	TCFL	0.2	0.0	0.2	0.0	0.7	0.3	0.2	0.0	0.2	0.0	0.3	0.2	1.2	0.9	45.5	1.9	0.7	8.0	0.3	1.5	0.4	1.2	2.2	5.1	3.6	0.0	0.0	0.0	13.2	90.1	0.2
16	WOOD	0.1	0.0	0.1	0.0	0.0	0.6	0.0	0.0	0.1	0.0	0.1	0.1	0.1	1.1	0.2	65.4	8.2	2.2	0.1	1.4	7.8	1.1	3.5	3.8	57.7	0.0	0.0	0.0	214.8	16.5	0.1
17	PAPR	5.4	0.1	0.1	0.3	0.4	0.2	0.0	0.0	0.4	0.1	1.2	0.9	2.7	6.4	0.5	6.4	132.6	88.0	2.3	24.6	5.8	1.4	0.8	5.3	4.0	3.5	0.1	0.0	11.1	85.6	2.1
18	PPRM	0.4	0.3	0.1	0.2	2.3	0.3	0.1	0.0	2.6	0.0	6.0	4.4	15.6	9.7	4.5	5.9	14.8	102.2	6.1	20.7	5.9	3.0	14.5	22.3	7.5	2.7	0.0	0.6	15.9	331.3	12.1
19	CHEM	13.7	14.8	24.0	4.4	17.8	6.1	0.4	0.1	11.1	0.2	9.3	6.6	8.5	2.3	3.1	36.3	31.0	7.6	645.0	262.6	7.3	6.0	28.6	36.6	9.8	1.2	1.8	0.3	14.0	115.3	1.5
20	RBPL	6.6	2.7	4.7	1.6	2.2	2.0	0.3	0.1	3.1	0.1	40.0	29.5	55.6	5.4	4.2	11.8	6.6	35.9	21.2	166.2	3.3	3.2	24.9	51.6	13.6	0.3	1.0	0.7	81.3	196.6	10.0
21	NMMP	0.3	0.3	0.4	0.1	0.3	0.1	0.1	0.3	9.3	0.5	0.2	0.2	1.8	15.4	0.1	1.0	0.3	1.5	0.4	2.4	185.8	4.7	15.4	69.1	4.0	0.0	2.5	1.0	356.0	38.0	0.7
22	BASM	0.1	0.1	0.1	0.0	1.5	1.7	0.0	0.1	4.8	0.1	8.7	6.4	6.9	3.3	3.1	8.6	11.7	10.8	14.4	13.5	18.3	196.4	286.5	208.5	33.1	0.6	2.8	0.3	24.8	268.2	8.4
23	FABM	1.8	1.6	2.1	0.6	2.4	2.2	1.2	0.2	5.4	0.3	12.0	8.9	21.4	54.3	5.8	10.7	13.3	9.0	18.0	32.0	17.4	112.8	445.8	401.0	33.5	4.1	1.3	1.6	146.7	257.4	17.7
24	MAEQ	1.2	1.1	2.0	0.4	13.3	1.0	10.5	0.1	30.2	0.2	3.3	2.4	6.1	5.6	3.5	2.5	4.0	9.1	10.5	7.1	3.2	15.2	26.1	307.1	4.3	17.8	0.6	1.3	154.9	209.1	11.8
25	OMFG	0.1	0.1	0.1	0.0	0.1	0.2	0.0	0.0	0.1	0.0	0.3	0.2	0.7	2.1	0.3	0.6	0.4	1.9	0.3	1.7	0.7	2.3	5.8	11.1	21.1	0.1	0.8	0.0	23.4	22.9	6.0
26	ELEC	5.2	0.9	2.5	0.9	0.6	0.5	0.7	0.2	9.8	1.2	20.5	10.9	13.5	3.3	3.9	14.1	48.2	8.0	24.6	14.7	14.7	118.6	11.0	17.1	4.1	546.0	12.6	0.6	9.9	133.1	34.8
27	WATS	-	-	-	-	1.1	0.0	0.5	0.0	0.4	0.0	9.7	2.9	1.0	2.8	0.4	-	0.0	-	-	-	-	-	-	0.7	-	0.4	128.9	0.0	0.8	20.7	1.0
28	WAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	4.4	3.6	0.0	0.5	7.6	0.0	1.8	5.2	1.2	0.0	0.6	0.1	7.2	0.7	0.2	0.9	87.1	15.7	1.9	0.3
29	CONS	2.3	2.1	2.9	0.8	1.1	1.9	1.2	3.0	64.5	5.0	0.7	0.5	1.0	1.9	1.7	3.2	5.6	1.4	1.3	2.6	21.6	1.7	9.1	91.4	2.3	105.8	0.1	4.1	1,699.1	40.5	0.9
30	TRDE	12.5	10.9	16.9	4.3	23.7	8.4	6.9	0.8	18.6	1.3	45.1	33.3	106.2	41.4	48.1	26.5	38.2	47.3	56.4	27.8	17.7	86.0	72.8	200.6	24.2	10.6	-	6.5	273.0	1,137.7	155.6
31	ACCR	0.2	0.1	0.1	0.1	0.5	0.2	0.0	0.0	0.7	0.0	0.4	0.3	0.7	0.4	0.5	0.4	0.2	1.0	0.8	1.3	0.5	0.4	1.2	2.9	0.5	0.4	0.0	0.2	6.2	30.2	3.8
32	RDFR	5.6	2.7	1.4	1.6	6.0	29.4	1.7	0.5	4.6	0.9	45.8	47.2	57.5	13.6	10.4	29.5	17.2	26.1	113.8	35.6	36.4	54.6	24.8	41.9	12.9	0.6	0.6	2.0	20.7	462.1	0.7
33	RDPS	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.3	0.2	0.2	0.1	0.1	0.6	0.1	0.1	0.0	0.0	1.6	4.8	1.2
34	RFRT	0.2	0.1	0.1	0.1	-	1.1	-	1.3	-	0.5	5.1	1.9	3.1	0.9	1.2	1.6	4.4	2.8	12.0	3.9	2.4	3.6	3.0	3.7	1.4	-	-	-	0.5	5.9	-
35	WFRT	-	-	-	-	-	0.5	0.4	0.2	18.7	1.6	11.4	-	2.9	1.4	-	2.3	9.8	-	4.4	-	12.6	5.3	1.1	1.4	-	-	0.7	0.8	0.8	-	4.6
36	OFRT	0.2	0.1	0.1	0.1	0.4	0.6	0.7	0.0	0.8	-	3.9	0.5	3.9	0.5	0.7	1.3	3.0	1.6	4.1	2.1	0.3	1.3	1.0	3.8	0.8	0.2	-	-	1.2	51.8	-
37	OTTR	1.3	0.6	0.4	0.4	3.5	5.0	5.5	0.4	11.0	0.4	33.9	4.0	31.9	4.6	5.4	11.0	26.7	12.7	34.9	17.4	6.0	12.1	8.8	31.1	6.5	1.7	0.2	0.2	9.6	409.6	1.1
38	COMM	4.4	2.2	1.5	2.2	4.3	2.3	1.1	0.2	4.0	0.3	7.8	5.8	11.7	5.0	4.7	6.2	6.2	24.4	16.5	22.4	8.8	7.3	16.7	43.5	6.7	6.1	0.0	2.0	52.3	379.7	13.8
39	FIIN	19.8	7.4	4.4	4.4	21.7	9.3	13.4	0.4	17.3	0.6	17.8	13.1	35.7	39.3	12.7	21.0	14.1	41.1	37.7	40.9	17.4	93.7	36.8	69.1	14.9	29.3	1.6	2.8	69.5	1,104.1	51.5
40	HOUS	3.3	1.9	3.1	0.2	2.0	0.7	0.2	0.0	2.0	0.1	5.6	4.1	7.2	2.8	5.4	3.8	1.4	12.0	6.3	11.9	4.2	3.4	17.2	25.5	7.9	11.2	0.0	0.9	29.3	473.4	22.9
41	EHOP	2.8	0.9	0.7	0.4	3.7	2.1	3.1	0.3	2.2	0.5	3.4	2.5	8.5	1.3	1.4	4.2	1.8	8.5	11.6	5.6	2.8	2.9	5.4	13.8	2.4	5.6	1.7	1.9	10.6	77.1	4.1
42	SRCS	4.1	2.1	1.4	0.5	9.0	3.3	2.9	0.3	55.0	0.6	22.3	16.5	18.8	20.6	4.5	5.7	29.8	21.0	41.4	26.4	16.7	26.1	34.8	101.6	6.5	152.0	1.6	0.9	79.7	410.0	13.8
43	OBUS	14.1	8.0	5.4	6.6	14.0	14.5	6.2	0.5	24.1	0.8	41.9	30.9	84.8	65.6	28.0	34.6	19.1	90.6	57.3	107.0	40.7	27.3	70.8	157.0	29.9	46.3	5.7	5.3	208.8	1,764.9	98.3
44	GOVC	1.0	1.2	1.0	0.3	0.7	0.8	0.5	0.0	0.5	0.1	0.7	0.5	1.3	0.5	0.6	5.2	1.2	1.7	1.2	1.6	2.0	0.6	2.1	3.4	2.3	0.8	0.0	0.4	7.4	51.6	3.2
45	GOVL	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.6	0.1	1.1	0.4	0.3	0.5	0.3	0.3	0.5	0.1	0.7	0.5	0.4	14.8	0.2	0.3	1.2	0.1	-	-	3.4	1.9	4.2	0.2
46	SCHL	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.3	0.0	0.2	0.1	0.4	0.2	0.3	1.2	0.2	3.5	0.3	0.8	0.2	0.1	1.4	1.4	0.3	1.4	0.0	0.0	1.3	8.7	0.6
47	OEDU	0.1	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.2	0.0	0.1	0.1	0.3	0.2	0.1	2.3	0.1	0.3	0.2	1.0	0.1	0.0	0.3	0.7	0.1	2.0	0.0	0.0	2.8	7.1	0.4
48	HOSP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	1.4	0.1
49	OHCS	0.3	0.7	1.9	0.1	0.5	0.1	0.0	0.0	0.1	0.0	0.3	0.2	0.3	0.7	0.1	0.5	1.0	1.1	0.2	0.7	0.9	0.2	0.8	1.5	0.1	0.5	0.0	0.0	1.3	9.8	0.3
50	CULT	1.6	0.9	0.6	0.5	2.7	0.3	0.0	0.0	0.8	0.0	6.0	4.4	12.4	7.0	2.3	2.4	1.4	22.8	4.5	19.0	6.5	1.8	5.0	15.4	2.9	2.2	0.0	0.3	6.5	207.0	11.2
51	PERS	0.2	0.1	0.3	0.1	2.2	1.1	0.9	0.0	0.5	0.0	19.2	14.2	3.9	3.3	4.0	0.4	0.2	13.2	2.3	3.3	0.8	0.4	4.6	7.0	0.7	6.2	0.0	0.1	11.4	50.7	1.9
	Other Imports	26.6	22.1	13.7	7.9	28.3	13.1	29.5	0.3	-	1.3	90.9	82.2	336.9	106.1	162.0	49.6	99.3	340.8	433.0	641.9	108.4	147.3	384.9	786.0	147.6	12.7	2.9	2.1	1,835.1	1,250.2	107.6
	Compensation of Employees	89.7	21.3	25.4	14.6	15.3	19.5	5.6	0.6	17.5	17.3	104.2	51.7	385.6	249.6	175.8	124.7	116.7	425.2	76.8	380.7	219.6	240.5	436.9	937.4	182.5	104.4	51.0	70.1	1,462.9	4,224.0	478.1
	Depreciation + Op Surplus	68.4	22.7	59.9	6.7	231.0	61.1	44.1	12.6	867.7	7.4	284.3	539.4	170.9	136.2	106.2	169.9	219.1	339.0	566.5	295.1	263.1	714.5	370.8	749.7	156.6	534.0	155.4	80.9	1,108.2	3,967.8	454.6
	Net Indirect Taxes	10.0	17.7	11.8	2.6	11.3	2.5	-0.3	1.8	566.1	0.5	15.1	18.3	6.3	314.1	2.7	6.7	7.8	16.5	17.2	18.8	20.1	10.0	19.4	15.5	5.5	10.1	1.6	3.5	98.0	278.8	63.8
	Domestic Import	40.9	59.1	42.4	14.7	68.3	80.0	25.0	8.4	833.2	12.4	1,226.9	1,765.0	262.3	60.5	116.5	282.7	102.8	99.5	262.4	74.3	115.7	230.1	45.9	79.5	79.0	444.3	7.4	6.8	570.1	875.1	228.6
	Gross Output	**353.0**	**216.0**	**246.2**	**82.4**	**510.2**	**288.6**	**177.4**	**36.4**	**2,967.4**	**59.8**	**2,260.8**	**2,843.8**	**2,058.0**	**1,261.0**	**798.0**	**1,012.5**	**1,016.8**	**1,884.0**	**2,615.7**	**2,320.5**	**1,244.8**	**2,164.0**	**2,456.1**	**4,556.1**	**900.2**	**2,109.6**	**384.3**	**290.9**	**8,700.5**	**19,369.1**	**2,225.9**

Table B.2: 2009 I-O table of Auckland (Million NZD) – Continuation (right hand side)

32 RDFR	33 RDPS	34 RFRT	35 WFRT	36 OFRT	37 OTTR	38 COMM	39 FIIN	40 HOUS	41 EHOP	42 SRCS	43 OBUS	44 GOVC	45 GOVL	46 SCHL	47 OEDU	48 HOSP	49 OHCS	50 CULT	51 PERS	Private Consumption	Government Consumption	Stock Change	Gross Investment	Exports	Import Adjustments	Final Demand	Gross Output
0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.3	1.5	0.3	0.5	1.1	0.3	0.0	0.0	0.0	4.3	0.1	0.5	0.1	163.7	2.8	-0.5	1.1	155.3	-0.0	-71.2	**353.0**
0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.5	0.0	24.8	0.4	0.1	0.1	9.8	-0.0	99.1	**216.0**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	6.3	2.0	0.0	0.1	1.3	-	129.9	**246.2**
0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.4	0.5	0.0	0.1	0.2	0.0	0.0	0.0	0.3	0.1	0.8	0.0	59.7	2.4	0.0	0.3	11.6	-0.0	-28.5	**82.4**
0.5	0.0	0.0	0.1	0.1	0.8	0.0	0.2	0.1	0.7	0.1	10.1	0.8	0.1	0.0	0.1	0.0	0.5	1.6	0.1	9.1	4.6	0.1	45.9	14.0	-0.0	392.9	**510.2**
0.9	0.0	0.0	0.0	0.1	0.4	0.1	0.2	0.1	0.1	0.2	18.1	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.1	22.0	1.0	24.8	3.1	64.8	-0.0	87.0	**288.6**
0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.9	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	1.6	0.1	27.2	-0.0	114.7	**177.4**
-	-	-	0.0	-	0.0	-	-	-	-	-	-	0.0	0.2	0.1	0.1	0.2	0.0	0.0	0.0	4.9	0.2	-	1.3	5.9	-	17.7	**36.4**
39.6	7.7	0.8	15.9	11.3	71.9	2.8	2.2	2.9	1.6	8.7	6.9	11.2	5.2	1.0	2.9	3.7	5.7	2.0	1.8	608.4	13.5	-8.6	332.5	741.7	-1,541.3	1,842.6	**2,967.4**
1.3	0.0	0.4	-	-	0.1	0.1	0.1	0.3	0.0	0.3	0.2	-	-	-	-	-	-	-	-	1.9	0.8	0.0	1.1	13.0	-0.6	-37.6	**59.8**
-	-	-	-	0.0	0.1	-	-	-	-	-	-	0.6	-	0.1	0.5	0.5	0.0	1.1	0.0	856.5	18.4	-	1.9	1,255.1	-0.0	12.9	**2,260.8**
0.0	0.0	-	-	0.0	0.0	0.0	0.1	0.1	0.0	0.4	0.4	-	0.0	0.0	0.1	0.1	0.0	-	0.0	461.4	7.2	-43.7	2.5	2,469.3	-	-100.6	**2,843.8**
0.1	0.0	0.0	0.1	0.1	0.7	0.2	2.7	0.5	1.0	1.0	3.0	0.8	0.2	0.1	0.8	15.7	1.2	9.9	0.2	962.2	5.6	-1.6	5.7	736.4	-0.0	-346.5	**2,058.0**
0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.6	0.1	0.0	0.1	2.3	0.1	0.0	0.0	0.3	0.1	0.1	8.6	0.0	1,074.5	18.1	4.2	0.7	329.7	-0.0	-402.0	**1,261.0**
0.4	0.2	0.0	0.0	0.1	0.4	0.1	0.3	21.7	0.2	0.6	4.0	3.0	0.3	0.8	1.7	0.8	0.4	3.7	0.1	161.6	2.4	10.3	3.4	347.5	-0.2	55.8	**798.0**
0.1	0.0	0.0	0.0	0.1	0.5	0.1	0.1	5.4	0.0	20.5	1.6	0.3	0.1	0.6	0.8	0.3	0.1	0.4	3.8	13.8	2.6	7.0	8.0	336.8	-0.0	224.5	**1,012.5**
1.7	0.8	0.2	0.5	1.0	6.1	0.4	3.1	37.4	0.2	12.8	111.9	0.3	0.2	0.6	1.4	0.7	3.3	0.3	0.2	119.1	2.7	0.5	0.8	399.8	-0.1	-81.4	**1,016.8**
5.8	2.1	0.6	2.0	3.6	22.5	42.3	67.9	16.7	9.4	47.1	270.0	15.3	1.9	7.4	12.7	5.1	13.9	35.1	28.7	185.7	3.2	7.7	11.3	141.8	-0.9	312.7	**1,884.0**
11.3	2.0	0.5	1.7	3.1	19.2	0.7	1.1	1.9	2.1	2.4	10.5	2.0	1.2	1.2	2.0	9.3	8.9	2.3	6.0	36.4	0.6	3.2	2.9	346.8	-2.5	811.7	**2,615.7**
0.2	1.8	0.1	0.3	0.5	2.8	2.7	3.4	18.4	2.4	8.9	48.8	4.0	1.6	1.4	3.8	16.2	16.1	2.8	13.8	210.5	41.3	1.2	48.3	472.9	-2.6	612.4	**2,320.5**
6.0	2.1	0.0	0.1	0.2	1.0	1.8	0.8	10.6	8.9	34.0	2.4	0.2	0.1	1.0	0.7	0.1	0.9	0.1	1.5	18.7	0.4	0.1	13.1	85.8	-2.5	344.1	**1,244.8**
0.5	0.3	0.0	0.1	0.2	1.5	0.4	9.2	1.3	0.6	32.9	12.5	0.4	0.2	1.7	1.2	0.2	1.4	2.9	0.3	10.5	0.3	0.5	18.7	719.7	-0.8	203.4	**2,164.0**
1.4	0.7	0.4	1.4	2.6	16.2	4.8	10.9	68.4	5.1	19.0	9.5	8.5	3.5	2.1	3.9	2.1	0.5	3.2	0.5	47.1	1.6	19.9	98.7	248.9	-1.6	234.4	**2,456.1**
12.1	9.8	3.6	12.3	22.3	138.6	92.2	6.1	13.0	20.9	30.7	49.0	34.5	21.5	8.8	29.9	22.9	3.4	32.9	8.2	315.8	1.5	33.9	974.6	1,452.3	-24.2	364.3	**4,556.1**
0.1	0.2	0.0	0.0	0.1	0.3	0.2	0.5	26.6	1.1	0.8	1.5	0.7	1.0	0.8	0.6	0.3	0.4	1.0	2.0	182.4	3.0	23.7	232.2	195.4	-0.1	122.1	**900.2**
1.9	1.0	1.1	0.2	2.4	14.9	16.9	12.4	1.5	2.6	19.4	26.1	12.0	16.9	6.9	23.3	7.5	10.8	18.5	4.9	911.8	16.2	0.0	53.9	5.3	-	-165.2	**2,109.6**
0.0	0.0	0.0	0.1	0.2	1.1	-	0.0	107.2	-	0.2	0.0	0.5	12.9	0.0	0.0	0.4	0.7	0.0	-	0.6	0.2	-	10.0	0.1	-0.0	78.7	**384.3**
0.3	0.0	0.0	0.0	0.1	0.5	0.3	12.2	1.5	0.1	0.2	5.5	12.0	30.4	2.2	1.4	6.6	13.9	0.3	24.5	4.3	0.3	0.0	0.4	0.0	-	31.3	**290.9**
5.5	3.8	0.6	2.1	3.9	24.2	47.6	33.6	658.0	4.4	16.6	14.2	102.4	229.8	9.0	57.7	12.4	36.7	62.6	28.7	76.5	2.6	1.6	4,906.6	55.3	-0.1	222.9	**8,700.5**
164.5	48.5	2.5	9.7	16.5	102.7	71.8	80.9	144.3	44.7	54.6	227.2	51.1	13.0	18.4	25.6	58.4	37.2	30.1	2.3	6,942.3	226.2	236.0	1,815.4	3,946.3	-1.4	2,441.3	**19,369.1**
1.7	0.3	0.5	1.9	3.4	21.0	1.2	6.9	1.3	1.2	8.1	13.2	32.6	2.4	9.1	15.5	7.9	23.1	12.3	6.7	1,601.5	27.0	1.4	2.9	633.1	-0.0	-264.8	**2,225.9**
545.2	3.0	1.3	4.6	8.4	52.1	22.2	8.0	1.1	8.8	8.9	38.5	6.9	4.1	1.0	2.5	1.0	3.4	11.9	11.2	66.0	12.3	0.0	9.4	38.8	-	719.2	**2,698.0**
6.3	5.4	0.1	0.5	0.8	5.3	0.5	5.6	0.1	1.2	11.4	14.5	3.5	0.2	6.0	7.1	1.8	6.8	8.7	6.7	130.7	70.2	0.2	2.4	62.1	-	60.0	**428.6**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	63.0	3.1	-	1.4	-	-	-30.8	**97.6**
52.9	9.5	11.7	-	0.7	6.1	11.9	3.0	-	-	-	-	-	-	-	-	-	-	-	-	29.3	2.6	-	14.2	-	-	126.2	**349.2**
6.1	-	0.5	2.8	14.8	90.8	5.1	5.1	0.5	2.5	9.1	18.0	4.5	0.6	0.2	1.5	0.4	0.8	4.2	1.6	45.2	3.0	0.3	6.7	226.0	-0.8	117.7	**652.4**
61.2	2.3	7.2	22.0	116.8	718.5	43.4	40.7	3.9	19.7	72.0	142.4	35.8	4.8	1.6	11.5	3.2	6.3	33.4	12.5	365.4	8.2	1.6	43.4	1,390.2	-4.7	213.5	**4,074.6**
110.8	9.2	1.3	4.4	7.9	49.5	790.7	152.2	14.3	15.7	117.9	215.8	58.0	21.3	5.4	34.7	14.2	30.3	81.6	33.3	873.5	21.6	-0.5	102.3	301.3	-0.3	710.4	**4,446.9**
67.9	21.4	6.5	22.4	40.6	252.8	80.8	3,109.1	493.3	114.7	193.5	507.2	127.3	32.9	8.8	50.2	37.8	100.2	187.6	125.5	1,274.9	29.3	0.4	110.3	249.8	-0.9	1,376.9	**10,483.7**
21.1	3.5	1.0	3.4	6.2	38.6	27.5	103.1	496.8	16.8	56.5	140.2	65.6	3.9	2.2	12.3	5.1	45.7	84.8	23.1	7,266.8	183.8	0.0	461.3	103.1	-0.0	604.3	**10,446.8**
28.2	11.2	6.5	22.4	40.6	252.8	9.3	31.9	12.3	76.9	44.0	63.6	21.9	22.0	0.8	10.2	8.3	13.7	26.2	14.1	58.0	15.2	0.9	21.1	187.2	-0.4	114.6	**1,307.1**
3.7	4.8	1.4	4.7	8.5	53.0	75.1	401.4	6.8	20.1	718.4	300.5	102.8	70.7	3.1	9.1	26.8	40.8	113.7	33.5	62.3	176.5	1.8	717.6	201.4	-2.6	810.9	**5,097.1**
60.2	22.8	4.6	16.0	29.0	180.3	270.5	624.8	123.3	102.8	398.3	1,297.5	226.2	68.9	30.0	103.1	72.2	155.7	356.4	216.1	206.9	80.1	0.3	154.3	350.2	-2.4	1,653.9	**9,910.9**
5.8	1.0	0.2	0.6	1.1	6.6	3.9	30.4	11.6	2.9	11.8	20.0	16.5	1.3	5.6	2.2	5.5	12.0	8.8	6.2	95.2	3,636.4	-0.1	15.3	25.7	-	-1,285.2	**2,736.1**
3.8	0.1	0.0	0.1	0.2	1.1	0.7	4.5	2.2	1.1	6.3	27.6	2.9	21.2	11.2	1.6	1.8	3.4	93.3	4.2	74.2	1,493.5	-	4.5	22.2	-	-381.6	**1,432.2**
0.6	0.3	0.1	0.3	0.6	3.5	2.2	2.8	2.1	0.7	3.9	7.7	4.4	1.5	3.8	7.7	2.2	2.1	7.9	5.9	59.4	1,303.2	0.1	1.5	43.1	-	15.5	**1,506.7**
0.3	0.3	0.1	0.2	0.3	2.0	4.2	3.8	1.3	0.9	9.6	34.0	9.1	0.4	2.9	22.6	1.9	8.5	2.1	17.1	479.0	703.0	0.3	13.5	318.2	-0.0	-36.3	**1,618.3**
0.4	0.0	0.0	0.0	0.1	0.4	0.2	0.4	0.1	0.1	2.3	1.2	3.5	0.0	0.0	0.4	0.6	2.1	0.2	0.4	235.0	2,093.9	0.0	3.7	6.7	-	-177.6	**2,176.5**
1.1	0.4	0.1	0.4	0.6	4.0	0.8	8.1	2.0	1.8	6.8	9.6	16.2	4.4	2.8	3.6	47.7	206.1	17.1	2.3	1,066.9	1,408.8	0.1	7.8	21.5	-0.0	-182.1	**2,682.9**
3.1	1.2	0.5	1.8	3.3	20.6	66.1	30.6	6.7	10.1	21.5	393.3	12.4	24.4	14.4	8.4	1.7	7.2	475.1	19.9	1,646.1	123.7	0.5	20.8	390.1	-0.0	586.8	**4,238.8**
13.2	0.8	0.1	0.4	0.7	4.1	4.3	14.6	32.3	2.2	15.5	95.5	14.0	40.0	7.2	9.9	18.1	18.9	35.5	108.9	1,110.1	36.6	0.4	5.5	47.5	-0.0	34.8	**1,824.4**
61.3	37.9	7.7	31.7	51.0	319.2	213.1	100.8	164.5	108.4	213.8	571.0	112.0	25.9	44.9	71.6	182.7	145.0	369.1	124.6	5,980.0	142.0	137.1	3,035.0	-	1,591.1	-	**21,111.6**
319.7	112.1	24.7	63.5	135.2	833.4	588.5	2,047.9	252.0	165.7	1,698.0	2,521.9	1,367.0	458.7	1,111.0	964.2	1,521.1	988.1	603.1	540.9	-	-	-	-	-	-	-	**27,041.8**
521.5	176.3	10.0	61.4	75.3	491.3	1,870.2	2,748.8	6,357.1	470.9	1,057.4	2,372.0	130.2	208.2	143.7	50.7	-0.3	622.2	1,192.7	330.6	-	-	-	-	-	-	-	**31,654.2**
364.4	-95.0	-3.4	-	7.7	48.7	40.9	707.4	1,197.2	35.1	31.8	39.2	29.3	7.1	9.5	6.5	-0.0	6.4	205.7	26.2	3,639.2	305.4	0.8	363.0	361.0	-	-	**8,907.8**
182.9	18.8	4.0	36.9	30.3	191.6	28.4	42.1	123.7	19.6	67.8	229.5	72.1	67.1	17.4	39.6	46.8	77.5	86.1	25.1	-	-	-	-	-	-	-12,310.2	**-2,783.2**
2,698.0	**428.6**	**97.6**	**349.2**	**652.4**	**4,074.6**	**4,446.9**	**10,483.7**	**10,446.8**	**1,307.1**	**5,097.1**	**9,910.9**	**2,736.1**	**1,432.2**	**1,506.7**	**1,618.3**	**2,176.5**	**2,682.9**	**4,238.8**	**1,824.4**	**39,921.6**	**12,261.3**	**467.8**	**13,712.7**	**19,568.8**	-	-	**221,550.9**

B.3. Waikato Regional Table

Table B.3: 2009 I-O table of Waikato (Million NZD)

Industries		1 HFRG	2 SBLC	3 DAIF	4 OTHF	5 SAHF	6 FOLO	7 FISH	8 COAL	9 FUEL	10 OMIN	11 MEAT	12 DAIR	13 OFOD	14 BEVT	15 TCFL	16 WOOD	17 PAPR	18 PPRM	19 CHEM	20 RBPL	21 NMMP	22 BASM	23 FABM	24 MAEQ	25 OMFG	26 ELEC	27 WATS	28 WAST	29 CONS	30 TRDE	31 ACCR
1	HFRG	2.2	11.0	32.7	1.4	2.3	2.8	0.0	0.0	0.0	0.0	10.6	-	14.1	12.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.3	8.1	14.0
2	SBLC	3.5	185.3	74.8	13.5	5.2	3.3	0.0	0.0	0.0	0.0	344.0	-	9.6	4.3	3.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.2	40.7	1.9
3	DAIF	1.5	29.3	25.6	3.4	1.9	0.5	0.0	0.0	0.0	0.0	-	645.5	2.6	2.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.1	3.8	1.0
4	OTHF	2.8	18.8	15.1	13.1	3.6	0.5	0.0	0.0	0.0	0.0	40.8	2.8	3.6	1.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.1	2.1	0.9
5	SAHF	13.8	62.2	43.2	9.2	15.5	32.8	0.0	0.0	0.0	0.0	20.4	-	1.2	0.4	0.1	0.3	0.1	0.0	0.4	0.1	0.1	0.1	0.1	0.3	0.0	0.1	0.0	0.0	0.7	3.0	0.1
6	FOLO	0.7	5.5	10.0	1.0	0.2	107.3	0.0	0.1	0.0	0.1	4.2	-	0.1	0.5	0.1	111.5	12.5	0.1	0.3	0.0	0.1	0.1	0.2	0.5	0.1	0.1	0.0	0.0	4.9	10.8	0.0
7	FISH	0.0	0.0	0.1	0.0	0.1	0.1	4.4	0.0	0.0	0.0	0.0	-	43.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.1
8	COAL	-	-	3.0	-	-	-	-	0.2	1.0	1.4	0.6	2.0	1.5	0.2	0.1	1.1	0.3	0.0	-	0.2	1.8	23.0	-	-	-	22.1	-	-	-	0.6	0.0
9	FUEL	0.1	1.0	1.0	0.4	0.5	1.1	0.1	0.7	14.9	0.8	0.3	0.3	0.6	0.2	0.1	0.5	0.3	0.5	1.9	0.2	0.2	0.2	0.3	0.5	0.1	5.4	0.0	0.1	2.3	2.1	0.2
10	OMIN	0.7	6.7	9.3	1.3	0.1	0.3	0.0	4.7	10.1	11.0	-	-	-	-	-	-	-	-	0.5	1.3	11.9	11.1	2.0	0.3	0.4	-	0.0	0.4	13.5	1.2	-
11	MEAT	0.3	3.4	15.1	3.0	0.3	0.2	0.2	0.4	0.0	0.7	48.6	-	4.0	-	5.8	-	-	2.3	-	4.9	-	-	-	-	-	-	-	-	-	1.1	49.4
12	DAIR	-	-	-	-	-	-	-	-	0.1	-	-	9.0	0.6	0.3	-	1.4	0.3	0.1	0.1	0.4	0.1	0.0	0.2	0.6	0.1	0.0	0.0	0.0	0.0	12.1	4.6
13	OFOD	0.3	3.3	13.6	2.6	0.3	0.1	0.9	0.0	0.0	0.0	2.1	1.5	44.0	4.1	0.0	0.5	0.2	0.3	0.1	0.5	0.1	0.0	0.2	0.3	0.0	0.0	0.0	0.0	0.1	6.1	16.4
14	BEVT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	9.3
15	TCFL	0.0	0.1	0.5	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	1.3	0.3	0.1	0.3	0.0	0.1	0.0	0.1	0.2	0.4	0.1	0.0	0.0	0.0	1.9	5.0	0.0
16	WOOD	0.1	0.5	0.7	0.1	0.0	2.3	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.7	0.0	65.0	4.2	0.4	0.0	0.4	2.2	0.5	1.3	1.4	9.0	0.0	0.0	0.0	166.7	4.8	0.0
17	PAPR	3.6	0.7	0.7	0.9	0.2	0.4	0.0	0.1	0.1	0.1	0.4	0.3	1.0	2.3	0.0	3.2	34.8	9.2	0.3	3.7	0.8	0.3	0.1	1.0	0.3	2.6	0.0	0.0	4.4	12.9	0.6
18	PPRM	0.2	1.2	0.5	0.5	0.8	0.4	0.0	0.0	0.4	0.0	1.4	1.0	3.7	2.3	0.2	2.0	2.6	7.1	0.5	2.1	0.6	0.4	1.9	2.8	0.4	1.4	0.0	0.1	4.2	33.2	2.2
19	CHEM	9.0	80.1	129.7	15.0	8.8	11.9	0.1	0.3	2.7	0.5	3.3	2.4	3.0	0.8	0.2	18.5	8.1	0.8	74.5	40.0	1.1	1.3	5.6	6.8	0.8	0.9	0.3	0.1	5.5	17.3	0.4
20	RBPL	3.9	13.3	23.4	5.0	1.0	3.5	0.1	0.1	0.7	0.2	12.9	9.5	18.0	1.8	0.3	5.5	1.6	3.4	2.2	23.0	0.4	0.6	4.4	8.8	1.0	0.2	0.2	0.1	29.4	26.8	2.5
21	NMMP	0.2	1.6	2.4	0.4	0.1	0.3	0.0	0.6	2.2	1.0	0.1	0.1	0.7	5.5	0.0	0.5	0.1	0.2	0.0	0.4	27.1	1.0	3.0	12.9	0.3	0.0	0.5	0.2	141.5	5.7	0.2
22	BASM	0.1	0.6	0.6	0.1	0.8	3.3	0.0	0.2	1.2	0.3	3.1	2.3	2.5	1.2	0.2	4.4	3.1	1.1	1.7	2.1	2.7	43.4	56.0	39.0	2.6	0.4	0.5	0.1	9.8	40.3	2.3
23	FABM	1.2	8.5	11.6	2.0	1.2	4.3	0.3	0.4	1.3	0.6	4.3	3.2	7.6	19.4	0.5	5.5	3.5	0.9	2.1	4.9	2.5	24.9	87.2	74.9	2.7	3.0	0.2	0.3	58.3	38.7	4.8
24	MAEQ	0.8	6.0	10.6	1.3	6.6	1.9	2.9	0.2	7.3	0.4	1.2	0.9	2.2	2.0	0.3	1.3	1.1	0.9	1.2	1.1	0.5	3.4	5.1	57.4	0.3	13.2	0.1	0.3	61.6	31.4	3.2
25	OMFG	0.0	0.2	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.2	0.6	1.0	0.8	0.0	0.1	0.0	4.6	1.7	0.8
26	ELEC	5.3	7.6	20.9	4.8	0.5	1.5	0.3	0.8	3.7	3.9	11.4	6.1	7.5	1.8	0.5	11.2	19.8	1.3	4.4	3.5	3.3	41.0	3.4	5.0	0.5	631.3	3.7	0.2	6.1	31.3	14.9
27	WATS	-	-	-	-	0.5	0.0	0.1	0.0	0.1	0.0	3.4	1.0	0.4	1.0	0.0	-	0.0	-	-	-	-	-	-	0.1	-	0.3	24.0	0.0	0.3	3.1	0.3
28	WAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.6	1.3	0.0	0.0	3.8	0.0	0.2	0.6	0.2	0.0	0.1	0.0	1.3	0.1	0.2	0.2	18.2	6.2	0.3	0.1
29	CONS	1.7	12.7	17.6	3.1	0.6	4.3	0.4	6.9	17.7	11.4	0.3	0.2	0.4	0.8	0.2	1.9	1.7	0.2	0.2	0.4	3.6	0.4	2.0	19.5	0.2	89.3	0.0	1.0	770.6	6.9	0.3
30	TRDE	7.8	56.2	86.9	13.7	11.2	15.6	1.8	1.5	4.2	2.5	15.3	11.3	36.0	14.0	3.6	12.8	9.6	4.7	6.2	4.0	2.5	18.1	13.6	35.7	1.8	7.5	-	1.3	103.3	162.7	40.7
31	ACCR	0.2	0.7	0.9	0.3	0.3	0.4	0.0	0.1	0.2	0.1	0.2	0.1	0.3	0.2	0.0	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.3	0.6	0.1	0.4	0.0	0.0	2.9	5.3	1.2
32	RDFR	4.2	16.9	8.8	6.3	3.4	66.0	0.5	1.3	1.3	2.1	18.7	19.3	23.5	5.6	0.9	17.2	5.2	3.1	15.1	6.2	6.1	13.9	5.6	9.0	1.2	0.5	0.1	0.5	9.4	79.7	0.2
33	RDPS	0.0	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.6	0.7	0.3
34	RFRT	0.2	1.1	0.8	0.4	-	3.4	-	4.2	-	1.7	2.9	1.1	1.8	0.5	0.1	1.3	1.8	0.5	2.2	0.9	0.6	1.3	0.9	1.1	0.2	-	-	-	0.3	1.4	-
35	WFRT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	OFRT	0.0	0.1	0.1	0.0	0.1	0.3	0.0	0.0	0.0	-	0.3	0.0	0.3	0.0	0.0	0.2	0.2	0.0	0.1	0.1	0.0	0.1	0.0	0.2	0.0	0.0	-	-	0.1	1.8	-
37	OTTR	0.2	0.8	0.6	0.4	0.4	2.4	0.4	0.2	0.7	0.2	3.0	0.4	2.8	0.4	0.1	1.4	1.7	0.3	1.0	0.7	0.2	0.7	0.4	1.4	0.1	0.3	0.0	0.0	0.9	15.2	0.1
38	COMM	2.4	10.1	6.8	6.2	1.8	3.7	0.3	0.3	0.8	0.6	2.3	1.7	3.5	1.5	0.3	2.6	1.4	2.1	1.6	2.8	1.1	1.4	2.7	6.8	0.4	3.8	0.0	0.4	17.3	47.6	3.2
39	FIIN	7.0	21.5	12.9	7.9	5.8	9.7	2.0	0.4	2.2	0.6	3.4	2.5	6.8	7.5	0.5	5.7	2.0	2.3	2.3	3.3	1.4	11.1	3.8	6.9	0.6	11.6	0.2	0.3	14.8	88.7	7.6
40	HOUS	2.2	10.5	16.5	0.6	1.0	1.4	0.1	0.1	0.5	0.1	2.0	1.5	2.6	1.0	0.4	1.9	0.4	1.3	0.7	1.8	0.6	0.8	3.4	4.8	0.6	8.3	0.0	0.2	11.6	71.1	6.3
41	EHOP	1.0	2.5	2.1	0.7	1.0	2.1	0.5	0.3	0.3	0.6	0.6	0.5	1.6	0.3	0.1	1.1	0.3	0.5	0.7	0.5	0.2	0.3	0.6	1.4	0.1	2.2	0.2	0.2	2.2	6.2	0.6
42	SRCS	2.2	9.0	6.2	1.5	3.6	5.2	0.6	0.6	10.7	0.9	6.4	4.7	5.4	5.9	0.3	2.3	6.3	1.8	3.9	3.3	2.0	4.7	5.5	15.3	0.4	90.9	0.2	0.2	25.6	49.8	3.1
43	OBUS	7.7	35.9	24.1	18.5	5.8	23.5	1.4	0.8	4.8	1.4	12.4	9.1	25.0	19.3	1.8	14.6	4.2	7.8	5.5	13.5	4.9	5.0	11.4	24.3	2.0	28.4	0.9	0.9	68.6	219.4	22.3
44	GOVC	0.7	6.5	5.4	1.1	0.3	1.6	0.1	0.1	0.1	0.1	0.3	0.2	0.5	0.2	0.1	2.8	0.3	0.2	0.1	0.3	0.3	0.1	0.4	0.7	0.2	0.6	0.0	0.1	3.1	8.1	0.9
45	GOVL	0.0	0.1	0.1	0.0	0.0	0.2	0.0	1.6	0.0	2.7	0.2	0.1	0.2	0.1	0.0	0.3	0.0	0.1	0.1	0.1	2.7	0.0	0.1	0.3	0.0	-	-	0.9	1.0	0.8	0.1
46	SCHL	0.1	0.5	0.6	0.2	0.1	0.2	0.0	0.0	0.1	0.0	0.1	0.0	0.2	0.1	0.0	0.6	0.0	0.4	0.0	0.1	0.0	0.0	0.3	0.3	0.0	1.0	0.0	0.0	0.5	1.4	0.2
47	OEDU	0.1	0.1	0.1	0.1	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	1.1	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	1.4	0.0	0.0	1.0	1.0	0.1
48	HOSP	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0
49	OHCS	0.2	4.5	12.2	0.5	0.3	0.2	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.3	0.0	0.3	0.3	0.1	0.0	0.1	0.2	0.0	0.2	0.3	0.0	0.4	0.0	0.0	0.6	1.7	0.1
50	CULT	1.1	5.0	3.5	1.5	1.3	0.5	0.0	0.0	0.2	0.1	2.1	1.6	4.4	2.5	0.2	1.2	0.4	2.4	0.5	2.9	1.0	0.4	1.0	2.9	0.2	1.6	0.0	0.1	2.6	31.1	3.1
51	PERS	0.2	0.7	1.9	0.2	1.1	2.2	0.2	0.0	0.1	0.0	7.0	5.1	1.4	1.2	0.3	0.2	0.1	1.4	0.3	0.5	0.1	0.1	0.9	1.3	0.1	4.7	0.0	0.0	4.6	7.8	0.5
	Other Imports	17.6	119.3	74.1	26.6	14.1	25.5	8.0	0.6	-	2.5	32.4	29.3	120.1	37.8	12.7	25.3	26.1	35.5	50.0	97.7	15.8	32.6	75.3	146.8	11.7	9.4	0.5	0.4	729.2	187.8	29.5
	Compensation of Employees	73.9	121.1	467.7	52.5	95.8	92.5	8.8	13.7	0.6	56.9	153.7	151.1	32.9	6.1	12.3	96.9	34.2	50.0	22.9	56.9	40.8	44.2	124.7	199.1	14.7	89.5	7.5	14.1	501.7	929.3	168.2
	Depreciation + Op Surplus	32.3	119.5	48.3	20.2	31.0	67.3	4.7	14.4	210.6	-5.7	-9.4	63.9	161.7	73.6	9.9	54.2	54.1	29.8	51.9	46.0	30.1	166.9	35.2	116.5	12.3	382.9	30.9	17.7	513.4	320.6	92.4
	Net Indirect Taxes	4.7	93.3	9.6	7.9	1.5	2.8	-0.0	2.1	137.4	-0.4	-0.5	2.2	6.0	169.7	0.2	2.1	1.9	1.4	1.6	2.9	2.3	2.3	1.8	2.4	0.4	7.2	0.3	0.8	45.4	22.5	13.0
	Domestic Import	14.9	73.0	79.0	28.8	22.7	53.2	8.9	15.3	274.3	20.7	37.2	17.7	122.3	34.5	5.2	29.9	22.0	20.9	44.2	18.6	9.4	22.1	18.3	38.0	4.5	136.8	0.8	2.1	102.7	293.5	86.9
	Gross Output	**232.9**	**1,169.0**	**1,332.0**	**278.3**	**254.2**	**564.0**	**48.4**	**73.3**	**712.8**	**120.4**	**805.7**	**1,013.4**	**733.4**	**449.4**	**62.8**	**515.0**	**266.9**	**196.2**	**302.2**	**353.3**	**181.3**	**478.5**	**480.3**	**851.1**	**71.6**	**1,560.1**	**71.6**	**61.2**	**3,457.0**	**2,909.5**	**611.0**

Table B.3: 2009 I-O table of Waikato (Million NZD) – Continuation (right hand side)

32 RDFR	33 RDPS	34 RFRT	35 WFRT	36 OFRT	37 OTTR	38 COMM	39 FIIN	40 HOUS	41 EHOP	42 SRCS	43 OBUS	44 GOVC	45 GOVL	46 SCHL	47 OEDU	48 HOSP	49 OHCS	50 CULT	51 PERS	Private Consumption	Government Consumption	Stock Change	Gross Investment	Exports	Import Adjustments	Final Demand	Gross Output
0.0	0.0	0.0	-	0.0	0.0	0.0	0.1	0.8	0.1	0.2	0.3	0.2	0.0	0.0	0.0	3.3	0.1	0.1	0.0	35.6	0.8	-0.3	0.7	102.4	-0.0	-23.4	**232.9**
0.1	0.0	0.0	-	0.0	0.1	0.0	0.0	0.3	0.4	0.2	0.1	0.2	0.0	0.0	0.0	0.3	0.1	0.9	0.0	5.4	0.1	0.3	0.8	53.0	-0.0	417.0	**1,169.0**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.8	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.3	0.1	0.2	0.0	1.4	0.6	0.1	0.8	6.8	-	603.0	**1,332.0**
0.0	0.0	0.0	-	0.0	0.1	0.0	0.0	0.5	0.4	0.0	0.1	0.2	0.0	0.0	0.0	0.4	0.2	0.5	0.0	13.0	0.7	0.2	1.2	39.3	-0.0	116.2	**278.3**
0.4	0.0	0.1	-	0.0	0.7	0.0	0.1	0.1	0.8	0.1	8.3	1.4	0.1	0.0	0.1	0.0	1.0	1.1	0.2	2.0	1.3	0.0	22.9	7.0	-0.0	2.2	**254.2**
0.8	0.0	0.0	-	0.0	0.3	0.0	0.1	0.2	0.1	0.1	15.1	0.1	0.2	0.1	0.1	0.0	0.1	0.1	0.1	4.8	0.3	48.4	6.1	126.7	-0.0	88.9	**564.0**
0.0	0.0	0.0	-	0.0	0.2	0.0	0.4	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.4	0.0	7.4	-0.0	-11.5	**48.4**
-	-	-	-	-	0.0	-	-	-	-	-	-	0.1	2.1	0.5	1.0	2.1	0.1	0.1	0.1	1.1	0.0	-	2.5	11.8	-	-7.3	**73.3**
0.9	0.2	0.1	-	0.1	1.7	0.1	0.0	0.1	0.0	0.2	0.1	0.5	0.4	0.0	0.1	0.2	0.3	0.0	0.1	132.4	3.8	-2.1	79.9	178.2	-370.2	648.8	**712.8**
0.6	0.0	0.5	-	-	0.0	0.0	0.0	0.2	0.0	0.1	0.1	-	-	-	-	-	-	-	-	0.4	0.2	0.0	2.1	26.2	-1.2	4.0	**120.4**
-	-	-	-	0.0	0.1	-	-	-	-	-	-	0.7	-	0.1	0.6	0.6	0.0	0.5	0.0	186.4	5.2	-	0.7	447.3	-0.0	23.7	**805.7**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.2	-	0.1	0.0	0.1	0.1	0.0	-	0.0	100.4	2.0	-15.6	0.9	880.0	-	15.0	**1,013.4**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.2	0.1	0.0	0.0	0.1	2.0	0.2	0.4	0.0	209.4	1.6	-0.6	2.0	262.4	-0.0	157.6	**733.4**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	233.9	5.1	1.5	0.3	117.5	-0.0	79.2	**449.4**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.2	0.3	0.1	0.1	0.2	0.1	0.0	0.1	0.0	35.2	0.7	0.8	0.3	27.3	-0.0	-15.5	**62.8**
0.0	0.0	0.0	-	0.0	0.1	0.0	0.0	2.2	0.0	5.0	0.4	0.2	0.0	0.3	0.5	0.2	0.0	0.1	1.5	3.0	0.7	3.5	4.0	171.3	-0.0	60.8	**515.0**
0.2	0.1	0.1	-	0.0	0.8	0.0	0.3	7.9	0.0	1.6	13.9	0.1	0.1	0.2	0.4	0.2	1.0	0.0	0.0	25.9	0.8	0.1	0.2	104.9	-0.0	22.7	**266.9**
0.5	0.2	0.2	-	0.1	2.0	3.3	4.2	2.3	1.1	3.9	22.5	2.7	0.5	1.4	2.4	1.1	2.9	2.5	4.0	40.4	0.9	0.8	1.2	14.8	-0.1	6.3	**196.2**
1.5	0.3	0.2	-	0.1	2.6	0.1	0.1	0.4	0.4	0.3	1.3	0.5	0.5	0.3	0.6	2.9	2.7	0.2	1.3	7.9	0.2	0.4	0.3	40.1	-0.3	-212.7	**302.2**
0.0	0.2	0.0	-	0.0	0.3	0.3	0.3	3.5	0.4	1.0	5.5	1.0	0.6	0.4	1.0	4.5	4.5	0.3	2.6	45.8	11.7	0.2	7.4	72.0	-0.4	-13.6	**353.3**
0.8	0.3	0.0	-	0.0	0.1	0.2	0.1	2.2	1.6	4.2	0.3	0.1	0.1	0.3	0.2	0.0	0.3	0.0	0.3	4.1	0.1	0.0	1.9	12.5	-0.4	-56.9	**181.3**
0.1	0.0	0.0	-	0.0	0.2	0.0	0.8	0.3	0.1	4.1	1.6	0.1	0.1	0.5	0.3	0.1	0.4	0.3	0.1	2.3	0.1	0.1	4.1	159.1	-0.2	78.1	**478.5**
0.2	0.1	0.2	-	0.1	2.2	0.6	1.0	14.4	0.9	2.4	1.2	2.2	1.5	0.6	1.1	0.7	0.2	0.3	0.1	10.2	0.4	3.9	19.3	48.7	-0.3	-12.5	**480.3**
1.6	1.3	1.5	-	0.8	18.9	10.8	0.6	2.7	3.7	3.8	6.1	9.0	8.9	2.5	8.6	7.1	1.0	3.4	1.7	68.7	0.4	6.3	182.1	271.3	-4.5	6.3	**851.1**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	2.7	0.1	0.0	0.1	0.1	0.2	0.1	0.1	0.0	0.1	0.1	0.2	39.7	0.8	1.9	18.5	15.5	-0.0	-20.3	**71.6**
0.4	0.2	0.7	-	0.1	3.2	3.1	1.8	0.5	0.7	3.8	5.1	4.9	11.0	3.1	10.4	3.6	5.2	3.0	1.6	198.4	4.6	0.0	39.8	3.9	-	393.3	**1,560.1**
0.0	0.0	0.0	-	0.0	0.1	-	0.0	22.6	-	0.0	0.0	0.1	5.4	0.0	0.0	0.1	0.2	0.0	-	0.1	0.1	-	1.9	0.0	-0.0	6.1	**71.6**
0.0	0.0	0.0	-	0.0	0.1	0.0	1.1	0.3	0.0	0.0	0.7	3.1	12.6	0.6	0.4	2.0	4.3	0.0	5.1	0.9	0.1	0.0	0.1	0.0	-	-6.0	**61.2**
0.9	0.6	0.3	-	0.2	3.8	6.4	3.5	157.9	0.9	2.4	2.0	30.4	109.1	2.9	18.8	4.4	12.9	7.5	6.9	16.7	0.7	0.7	1,949.6	22.0	-0.0	119.4	**3,457.0**
21.3	6.3	1.0	-	0.6	13.3	8.0	7.0	28.9	7.5	6.5	26.9	12.6	5.2	5.0	7.0	17.1	10.9	3.0	0.5	1,510.8	64.0	35.4	272.7	592.8	-0.2	-461.0	**2,909.5**
0.3	0.1	0.3	-	0.1	3.3	0.2	0.7	0.3	0.2	1.2	1.9	9.8	1.2	3.0	5.1	2.8	8.3	1.5	1.6	348.5	7.6	0.4	0.8	173.8	-0.0	22.3	**611.0**
85.3	0.5	0.7	-	0.3	8.1	3.0	0.8	0.3	1.8	1.3	5.5	2.1	2.0	0.3	0.8	0.3	1.2	1.4	2.7	14.4	3.5	0.0	1.3	5.3	-	-126.8	**367.7**
0.9	0.7	0.1	-	0.0	0.7	0.1	0.5	0.0	0.2	1.4	1.8	0.9	0.1	1.7	2.0	0.6	2.1	0.9	1.4	28.4	19.9	0.0	0.3	8.5	-	-17.9	**58.4**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.7	0.9	-	0.6	-	-	-4.1	**41.8**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.4	0.7	-	-	-	-	-7.1	**-**
0.2	-	0.1	-	0.1	2.9	0.1	0.1	0.0	0.1	0.3	0.5	0.3	0.1	0.0	0.1	0.0	0.1	0.1	0.1	9.8	0.9	0.0	0.2	8.1	-0.0	-5.0	**23.3**
2.1	0.1	0.8	-	1.0	24.2	1.3	0.9	0.2	0.9	2.2	4.4	2.3	0.5	0.1	0.8	0.2	0.5	0.9	0.6	79.5	2.3	0.2	5.9	189.5	-0.6	197.2	**555.3**
12.6	1.0	0.5	-	0.2	5.6	77.1	11.6	2.5	2.3	12.3	22.4	12.6	7.4	1.3	8.3	3.6	7.8	7.1	5.8	190.1	6.1	-0.1	12.0	35.2	-0.0	-63.1	**519.8**
5.0	1.6	1.5	-	0.8	18.4	5.0	152.0	55.5	10.7	12.9	33.8	17.7	7.3	1.3	7.7	6.2	16.5	10.5	14.1	277.4	8.3	0.0	10.1	22.8	-0.1	8.5	**958.7**
2.9	0.5	0.4	-	0.2	5.3	3.2	9.4	104.5	2.9	7.0	17.5	17.0	1.6	0.6	3.5	1.6	14.1	8.9	4.9	1,581.5	52.0	0.0	97.0	21.7	-0.0	84.7	**2,197.0**
2.1	0.8	1.5	-	0.8	18.4	0.6	1.6	1.4	7.2	2.9	4.2	3.0	4.9	0.1	1.6	1.4	2.3	1.5	1.6	12.6	4.3	0.2	3.7	32.8	-0.1	86.3	**229.0**
0.4	0.5	0.5	-	0.2	5.8	7.1	29.7	1.2	2.9	72.3	30.3	21.6	23.8	0.7	2.1	6.7	10.2	9.6	5.7	13.6	50.0	0.2	89.4	25.1	-0.3	-53.1	**634.7**
6.8	2.6	1.6	-	0.9	20.3	26.2	47.3	21.5	14.9	41.0	133.7	48.6	23.7	7.1	24.4	18.4	39.7	30.9	37.6	45.0	22.7	0.0	19.2	43.6	-0.3	-68.4	**1,234.1**
0.8	0.1	0.1	-	0.0	0.9	0.5	2.9	2.5	0.5	1.5	2.6	4.4	0.6	1.7	0.6	1.8	3.9	1.0	1.4	20.7	1,029.0	-0.0	4.0	6.7	-	-413.5	**710.1**
0.6	0.0	0.0	-	0.0	0.2	0.1	0.5	0.6	0.2	1.0	4.3	0.9	11.0	4.0	0.6	0.7	1.3	12.1	1.1	16.2	422.6	-	1.9	9.3	-	95.2	**596.0**
0.1	0.0	0.0	-	0.0	0.5	0.3	0.3	0.5	0.1	0.5	1.0	1.2	0.7	1.1	2.3	0.7	0.7	0.9	1.3	12.9	368.8	0.0	0.4	12.3	-	17.6	**431.3**
0.0	0.0	0.0	-	0.0	0.3	0.5	0.3	0.2	0.2	1.1	3.9	2.2	0.1	0.8	6.0	0.5	2.4	0.2	3.3	104.2	198.9	0.1	3.9	91.1	-0.0	36.9	**463.3**
0.1	0.0	0.0	-	0.0	0.1	0.0	0.0	0.0	0.0	0.3	0.2	1.0	0.0	0.0	0.1	0.2	0.7	0.0	0.1	51.1	592.5	0.0	1.1	2.1	-	21.0	**671.3**
0.2	0.1	0.1	-	0.0	0.7	0.1	0.9	0.5	0.4	1.0	1.4	5.0	2.2	0.9	1.2	17.4	75.2	2.1	0.6	232.2	398.7	0.0	2.4	6.6	-0.0	54.8	**827.5**
0.4	0.2	0.2	-	0.1	2.8	7.7	2.8	1.4	1.8	2.7	49.0	3.2	10.1	4.1	2.4	0.5	2.2	49.8	4.2	358.2	35.0	0.1	2.2	40.9	-0.0	-212.9	**444.4**
1.8	0.1	0.0	-	0.0	0.6	0.5	1.4	6.9	0.4	2.0	12.1	3.7	16.9	2.1	2.9	5.7	5.9	3.8	23.3	241.6	10.3	0.1	1.1	10.0	-0.0	-13.7	**384.1**
8.4	5.2	3.3	-	1.8	43.5	24.9	9.2	34.6	19.0	26.6	71.1	29.1	10.8	12.8	20.5	56.3	44.7	38.7	26.2	1,301.4	33.0	31.9	706.4	-	379.4	-	**4,933.1**
136.9	36.1	9.3	-	4.2	35.0	80.1	176.5	58.4	14.6	254.6	451.8	374.6	172.5	324.4	205.7	384.6	279.4	162.9	148.7	-	-	-	-	-		-	**7,044.7**
16.2	-21.1	6.3	-	3.2	138.4	207.5	259.9	1,332.3	96.0	89.8	159.9	17.6	104.4	35.2	76.8	82.8	217.0	40.0	37.3	-	-	-	-	-		-	**5,696.6**
11.3	11.4	-2.2	-	0.3	13.7	4.5	66.9	250.9	7.1	2.7	2.6	4.0	3.5	2.3	9.9	1.7	2.2	6.9	3.0	792.0	71.1	0.2	84.5	84.0	-	-	**1,979.6**
42.0	8.1	11.9	-	6.5	154.2	36.3	160.6	67.0	25.1	55.9	106.0	56.8	32.0	6.3	23.5	23.1	40.2	27.7	30.7	-	-	-	-	-	-	-1,646.8	**925.4**
367.7	**58.4**	**41.8**	**-**	**23.3**	**555.3**	**519.8**	**958.7**	**2,197.0**	**229.0**	**634.7**	**1,234.1**	**710.1**	**596.0**	**431.3**	**463.3**	**671.3**	**827.5**	**444.4**	**384.1**	**8,688.1**	**3,447.2**	**120.0**	**3,672.5**	**4,651.6**	**-**	**-**	**52,144.1**

B.4. Bay of Plenty Regional Table

Table B.4: 2009 I-O table of Bay of Plenty (Million NZD)

Industries		1 HFRG	2 SBLC	3 DAIF	4 OTHF	5 SAHF	6 FOLO	7 FISH	8 COAL	9 FUEL	10 OMIN	11 MEAT	12 DAIR	13 OFOD	14 BEVT	15 TCFL	16 WOOD	17 PAPR	18 PPRM	19 CHEM	20 RBPL	21 NMMP	22 BASM	23 FABM	24 MAEQ	25 OMFG	26 ELEC	27 WATS	28 WAST	29 CONS	30 TRDE	31 ACCR
1	HFRG	2.8	9.8	29.2	0.5	2.5	3.7	0.0	0.0	0.0	0.0	7.2	-	9.6	8.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.2	7.2	11.0
2	SBLC	1.3	47.6	19.2	1.3	1.7	1.3	0.0	0.0	0.0	0.0	67.4	-	1.9	0.8	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	10.5	0.4
3	DAIF	1.7	22.9	20.0	1.0	1.8	0.6	0.0	0.0	0.0	0.0	-	384.2	1.5	1.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	3.0	0.7
4	OTHF	3.2	14.7	11.8	3.8	3.5	0.6	0.0	0.0	0.0	0.0	24.3	1.7	2.1	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	1.6	0.6
5	SAHF	17.1	53.0	36.8	2.9	16.4	41.8	0.0	0.0	0.0	0.0	13.2	-	0.8	0.2	0.0	0.4	0.2	0.0	0.3	0.1	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.4	2.5	0.1
6	FOLO	0.8	4.3	7.8	0.3	0.2	125.3	0.0	0.0	0.0	0.0	2.5	-	0.1	0.3	0.1	143.9	32.8	0.1	0.2	0.0	0.0	0.0	0.1	0.4	0.2	0.1	0.0	0.0	2.4	8.5	0.0
7	FISH	0.0	0.0	0.0	0.0	0.1	0.1	3.6	0.0	0.0	0.0	0.0	-	20.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.1
8	COAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	FUEL	0.9	8.1	7.9	1.3	5.1	13.1	1.1	1.7	73.8	2.0	1.6	1.9	3.4	1.0	0.4	6.5	8.9	3.1	15.3	1.2	1.0	0.1	1.3	3.7	1.0	23.7	0.0	0.3	11.5	16.6	1.2
10	OMIN	0.5	3.1	4.3	0.2	0.1	0.2	0.0	0.7	3.0	1.6	-	-	-	-	-	-	-	-	0.2	0.4	4.1	0.3	0.6	0.1	0.3	-	0.0	0.1	4.0	0.6	-
11	MEAT	0.2	1.4	6.1	0.4	0.2	0.1	0.1	0.1	0.0	0.1	14.9	-	1.2	-	2.0	-	-	0.7	-	1.4	-	-	-	-	-	-	-	-	-	0.4	17.6
12	DAIR	-	-	-	-	-	-	-	-	0.0	-	-	5.2	0.3	0.2	-	1.8	0.7	0.0	0.1	0.2	0.1	0.0	0.1	0.4	0.1	0.0	0.0	0.0	0.0	9.2	3.1
13	OFOD	0.7	6.4	26.1	1.8	0.8	0.4	2.3	0.0	0.0	0.0	3.1	2.2	64.5	6.0	0.1	1.5	1.2	0.4	0.2	0.6	0.1	0.0	0.2	0.6	0.2	0.0	0.0	0.0	0.1	11.7	27.9
14	BEVT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	11.5
15	TCFL	0.0	0.1	0.4	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.9	0.4	0.2	0.2	0.0	0.0	0.0	0.0	0.1	0.3	0.1	0.0	0.0	0.0	0.9	3.9	0.0
16	WOOD	0.1	0.4	0.5	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.0	83.9	11.0	0.3	0.0	0.2	1.3	0.0	0.6	1.0	12.7	0.0	0.0	0.0	82.3	3.8	0.0
17	PAPR	4.1	0.6	0.6	0.3	0.2	0.5	0.0	0.0	0.1	0.0	0.3	0.2	0.6	1.3	0.0	4.2	91.2	5.2	0.2	2.1	0.5	0.0	0.1	0.7	0.5	1.1	0.0	0.0	2.2	10.0	0.4
18	PPRM	0.1	0.7	0.3	0.1	0.5	0.4	0.0	0.0	0.2	0.0	0.6	0.5	1.6	1.0	0.1	1.9	5.0	3.0	0.3	0.9	0.2	0.0	0.7	1.5	0.4	0.4	0.0	0.0	1.5	19.0	1.1
19	CHEM	10.3	62.6	101.3	4.3	8.6	13.9	0.1	0.1	1.3	0.1	2.0	1.4	1.8	0.5	0.2	23.8	21.3	0.5	59.6	22.0	0.6	0.1	2.7	5.1	1.1	0.4	0.1	0.0	2.7	13.5	0.3
20	RBPL	3.8	8.7	15.3	1.2	0.8	3.4	0.1	0.0	0.3	0.0	6.5	4.8	9.0	0.9	0.2	5.9	3.5	1.6	1.5	10.6	0.2	0.0	1.8	5.5	1.2	0.1	0.0	0.1	12.2	17.5	1.4
21	NMMP	0.2	0.9	1.4	0.1	0.1	0.2	0.0	0.1	0.8	0.2	0.0	0.0	0.3	2.4	0.0	0.5	0.1	0.1	0.0	0.1	11.5	0.0	1.1	7.0	0.3	0.0	0.1	0.1	51.0	3.3	0.1
22	BASM	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.1	0.0	0.2	0.1	0.1	0.1	0.0	0.5	0.7	0.1	0.1	0.1	0.1	0.2	2.4	2.6	0.3	0.0	0.0	0.0	0.4	2.8	0.1
23	FABM	1.2	5.7	7.7	0.5	1.0	4.3	0.3	0.1	0.6	0.1	2.2	1.6	3.9	9.8	0.3	6.0	7.8	0.5	1.4	2.3	1.3	1.0	35.8	47.6	3.2	1.1	0.0	0.2	24.6	25.8	2.9
24	MAEQ	0.9	4.7	8.3	0.4	6.4	2.2	2.9	0.1	3.6	0.1	0.7	0.5	1.3	1.2	0.2	1.6	2.8	0.5	1.0	0.6	0.3	0.2	2.5	42.6	0.5	5.8	0.0	0.2	30.4	24.5	2.2
25	OMFG	0.0	0.2	0.3	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.0	0.4	0.2	0.1	0.0	0.1	0.1	0.0	0.5	1.4	2.1	0.0	0.0	0.0	4.1	2.4	1.0
26	ELEC	6.1	6.0	16.3	1.4	0.4	1.8	0.3	0.2	1.8	1.0	6.8	3.6	4.5	1.1	0.3	14.5	51.8	0.7	3.6	1.9	2.0	1.9	1.6	3.7	0.7	279.8	0.7	0.1	3.0	24.4	10.3
27	WATS	-	-	-	-	0.2	0.0	0.0	0.0	0.0	0.0	0.6	0.2	0.1	0.2	0.0	-	0.0	-	-	-	-	-	-	0.0	-	0.0	1.4	0.0	0.0	0.8	0.1
28	WAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.9	0.8	0.0	0.0	5.0	0.0	0.1	0.5	0.1	0.0	0.0	0.0	1.0	0.1	0.1	0.0	11.0	3.1	0.2	0.0
29	CONS	2.0	9.9	13.8	0.9	0.6	5.0	0.4	1.7	8.8	2.8	0.2	0.1	0.2	0.5	0.1	2.4	4.4	0.1	0.1	0.2	2.1	0.0	1.0	14.5	0.3	39.6	0.0	0.6	380.6	5.4	0.2
30	TRDE	9.4	46.1	71.3	4.1	11.4	19.1	1.9	0.4	2.2	0.7	9.6	7.1	22.5	8.8	2.5	17.4	26.3	2.8	5.2	2.3	1.5	0.9	6.8	27.9	2.7	3.5	-	0.8	53.6	133.3	29.5
31	ACCR	0.2	0.6	0.7	0.1	0.3	0.5	0.0	0.0	0.1	0.0	0.1	0.1	0.2	0.1	0.0	0.3	0.2	0.1	0.1	0.1	0.0	0.0	0.1	0.5	0.1	0.2	0.0	0.0	1.4	4.1	0.8
32	RDFR	4.8	13.2	6.9	1.8	3.3	77.0	0.5	0.3	0.6	0.5	11.2	11.5	14.0	3.3	0.6	22.2	13.6	1.8	12.1	3.4	3.6	0.6	2.7	6.7	1.7	0.2	0.0	0.3	4.7	62.1	0.2
33	RDPS	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.4	0.2
34	RFRT	0.3	1.1	0.8	0.1	-	5.1	-	1.3	-	0.5	2.2	0.8	1.3	0.4	0.1	2.1	6.2	0.3	2.3	0.7	0.4	0.1	0.6	1.1	0.3	-	-	-	0.2	1.4	-
35	WFRT	-	-	-	-	-	0.1	0.0	0.0	0.2	0.1	0.2	-	0.1	0.0	-	0.2	0.7	-	0.0	-	0.1	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	0.1
36	OFRT	0.1	0.3	0.2	0.0	0.2	1.2	0.2	0.0	0.1	-	0.7	0.1	0.7	0.1	0.0	0.8	1.9	0.1	0.3	0.2	0.0	0.0	0.1	0.5	0.1	0.1	-	-	0.2	5.4	-
37	OTTR	0.9	2.4	1.8	0.4	1.7	11.1	1.5	0.2	1.3	0.2	7.0	0.8	6.6	0.9	0.3	7.0	17.9	0.7	3.1	1.4	0.5	0.1	0.8	4.2	0.7	0.6	0.0	0.0	1.8	46.9	0.2
38	COMM	1.6	4.5	3.1	1.0	1.0	2.5	0.1	0.0	0.2	0.1	0.8	0.6	1.2	0.5	0.1	2.0	2.1	0.7	0.7	0.9	0.4	0.0	0.8	2.9	0.4	1.0	0.0	0.1	4.9	21.4	1.3
39	FIIN	9.6	20.1	12.1	2.7	6.7	13.5	2.3	0.1	1.3	0.2	2.4	1.8	4.9	5.3	0.4	8.8	6.2	1.6	2.2	2.2	0.9	0.6	2.2	6.1	1.1	6.1	0.0	0.2	8.7	82.9	6.3
40	HOUS	2.5	8.2	12.9	0.2	1.0	1.6	0.1	0.0	0.2	0.0	1.2	0.9	1.5	0.6	0.3	2.5	1.0	0.7	0.6	1.0	0.4	0.0	1.6	3.5	0.9	3.7	0.0	0.1	5.8	55.5	4.3
41	EHOP	2.1	3.7	3.1	0.4	1.8	4.7	0.9	0.2	0.3	0.3	0.7	0.5	1.8	0.3	0.1	2.7	1.3	0.5	1.1	0.5	0.2	0.0	0.5	1.9	0.3	1.8	0.1	0.2	2.1	9.0	0.8
42	SRCS	1.9	5.2	3.6	0.3	2.6	4.5	0.5	0.1	3.9	0.2	2.8	2.1	2.4	2.6	0.1	2.2	12.3	0.7	2.3	1.3	0.8	0.2	2.0	8.4	0.4	29.8	0.0	0.1	9.4	28.7	1.6
43	OBUS	7.4	23.7	15.9	4.5	4.7	23.2	1.2	0.2	2.0	0.3	6.2	4.6	12.6	9.7	1.0	15.8	9.2	3.8	3.7	6.3	2.4	0.2	4.6	15.2	2.4	10.6	0.1	0.5	28.6	144.4	13.0
44	GOVC	0.6	3.6	3.0	0.2	0.2	1.4	0.1	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.0	2.5	0.6	0.1	0.1	0.1	0.1	0.0	0.1	0.4	0.2	0.2	0.0	0.0	1.1	4.5	0.4
45	GOVL	0.0	0.1	0.0	0.0	0.0	0.3	0.0	0.4	0.0	0.7	0.1	0.1	0.1	0.1	0.0	0.4	0.1	0.0	0.1	0.0	1.6	0.0	0.0	0.2	0.0	-	-	0.5	0.5	0.6	0.0
46	SCHL	0.1	0.4	0.4	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.8	0.1	0.2	0.0	0.1	0.0	0.0	0.1	0.2	0.0	0.5	0.0	0.0	0.3	1.1	0.1
47	OEDU	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.4	0.0	0.0	0.3	0.5	0.0
48	HOSP	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
49	OHCS	0.3	3.5	9.6	0.1	0.3	0.2	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.0	0.4	0.8	0.1	0.0	0.1	0.1	0.0	0.1	0.3	0.0	0.2	0.0	0.0	0.3	1.4	0.1
50	CULT	1.2	3.9	2.7	0.4	1.3	0.6	0.0	0.0	0.1	0.0	1.3	0.9	2.6	1.5	0.1	1.6	1.0	1.4	0.4	1.6	0.6	0.0	0.5	2.1	0.3	0.7	0.0	0.0	1.3	24.3	2.1
51	PERS	0.2	0.5	1.3	0.0	0.9	2.3	0.2	0.0	0.0	0.0	3.6	2.7	0.7	0.6	0.2	0.3	0.1	0.7	0.2	0.2	0.1	0.0	0.4	0.9	0.1	1.8	0.0	0.0	2.0	5.3	0.3
	Other Imports	20.0	93.2	57.9	7.6	13.6	29.8	8.0	0.1	-	0.6	19.3	17.4	71.5	22.5	8.5	32.6	68.2	20.3	40.0	53.8	9.2	1.5	36.2	109.1	16.7	4.2	0.1	0.3	360.1	146.5	20.4
	Compensation of Employees	103.5	24.0	99.2	13.4	171.5	105.2	4.9	-	4.3	5.8	34.8	30.7	60.3	3.7	8.1	95.3	136.2	21.4	18.4	27.4	18.1	1.5	49.5	130.0	18.7	33.9	1.5	12.8	279.6	621.1	117.4
	Depreciation + Op Surplus	20.1	133.0	260.1	6.9	-45.2	81.2	8.6	6.6	102.1	6.3	48.2	95.4	57.0	43.8	6.6	98.6	96.7	23.9	41.4	28.9	22.8	8.2	26.9	104.2	19.5	175.3	5.5	6.4	224.3	347.2	62.7
	Net Indirect Taxes	2.9	103.9	51.4	2.7	-2.2	3.4	-0.1	0.9	66.6	0.5	2.6	3.2	2.1	101.0	0.2	3.9	3.5	1.2	1.3	1.8	1.7	0.1	1.4	2.2	0.7	3.3	0.1	0.3	19.8	24.4	8.8
	Domestic Import	17.9	146.1	87.1	9.9	19.3	46.8	6.1	2.5	73.5	4.6	169.2	12.5	41.1	20.9	6.5	38.0	49.0	11.9	21.3	14.6	14.5	4.0	39.7	64.0	9.0	60.9	3.2	1.2	78.3	265.9	56.8
	Gross Output	**265.6**	**913.4**	**1,040.8**	**79.8**	**245.8**	**658.4**	**48.4**	**18.2**	**353.7**	**29.9**	**479.6**	**603.2**	**436.5**	**267.5**	**41.8**	**664.6**	**699.1**	**112.1**	**241.8**	**194.3**	**105.7**	**22.0**	**231.0**	**632.5**	**101.7**	**691.4**	**13.0**	**36.7**	**1,707.4**	**2,269.8**	**421.9**

Table B.4: 2009 I-O table of Bay of Plenty (Million NZD) – Continuation (right hand side)

32 RDFR	33 RDPS	34 RFRT	35 WFRT	36 OFRT	37 OTTR	38 COMM	39 FIIN	40 HOUS	41 EHOP	42 SRCS	43 OBUS	44 GOVC	45 GOVL	46 SCHL	47 OEDU	48 HOSP	49 OHCS	50 CULT	51 PERS	Private Consumption	Government Consumption	Stock Change	Gross Investment	Exports	Import Adjustments	Final Demand	Gross Output
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.1	0.1	0.2	0.1	0.0	0.0	0.0	2.5	0.1	0.1	0.0	22.4	0.5	-0.3	0.9	116.8	-0.0	29.1	**265.6**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.0	3.4	0.1	0.2	0.6	41.4	-0.0	712.9	**913.4**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.9	0.4	0.1	0.6	5.3	-	593.4	**1,040.8**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.1	0.1	0.0	0.0	0.0	0.3	0.1	0.3	0.0	8.2	0.4	0.0	0.3	11.3	-0.0	-10.7	**79.8**
0.3	0.0	0.1	0.0	0.1	0.5	0.0	0.1	0.1	0.6	0.0	5.4	0.8	0.1	0.0	0.1	0.0	0.7	0.7	0.1	1.2	0.9	0.0	22.1	6.8	-0.0	18.4	**245.8**
0.6	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.1	0.1	0.1	9.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	3.0	0.2	56.5	7.1	147.9	-0.0	102.6	**658.4**
0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.4	0.0	7.4	-0.0	13.5	**48.4**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7	0.0	-	0.6	2.9	-	13.9	**18.2**
6.3	1.2	0.6	0.3	1.7	11.5	0.2	0.2	0.7	0.3	1.1	0.9	2.6	2.6	0.3	0.8	1.3	2.0	0.2	0.4	83.5	2.6	-1.0	39.6	88.4	-183.7	70.0	**353.7**
0.2	0.0	0.3	-	-	0.0	0.0	0.0	0.1	0.0	0.0	0.0	-	-	-	-	-	-	-	-	0.3	0.1	0.0	0.5	6.5	-0.3	-2.7	**29.9**
-	-	-	-	0.0	0.0	-	-	-	-	-	-	0.2	-	0.0	0.2	0.2	0.0	0.2	0.0	117.5	3.5	-	0.4	266.2	-0.0	44.2	**479.6**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	-	0.0	0.0	0.0	0.1	0.0	-	0.0	63.3	1.4	-9.3	0.5	523.8	-	1.4	**603.2**
0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.0	0.1	3.3	0.3	0.6	0.0	132.0	1.1	-0.3	1.2	156.2	-0.0	-18.2	**436.5**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	147.4	3.4	0.9	0.2	69.9	-0.0	31.0	**267.5**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.0	22.2	0.4	0.5	0.2	18.2	-0.0	-9.6	**41.8**
0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	1.5	0.0	3.0	0.2	0.1	0.0	0.2	0.3	0.1	0.0	0.1	0.9	1.9	0.5	4.6	5.2	221.1	-0.0	223.1	**664.6**
0.2	0.1	0.1	0.0	0.1	0.6	0.0	0.2	5.3	0.0	1.0	8.3	0.0	0.1	0.1	0.2	0.1	0.7	0.0	0.0	16.3	0.5	0.4	0.6	274.9	-0.1	262.4	**699.1**
0.3	0.1	0.1	0.0	0.2	1.0	1.1	1.8	1.2	0.5	1.7	9.8	1.0	0.3	0.6	1.0	0.5	1.4	1.1	1.8	25.5	0.6	0.5	0.7	8.4	-0.1	8.9	**112.1**
1.1	0.2	0.2	0.0	0.3	1.8	0.0	0.1	0.3	0.2	0.2	0.8	0.3	0.4	0.2	0.3	1.9	1.8	0.1	0.8	5.0	0.1	0.3	0.3	32.1	-0.2	-169.0	**241.8**
0.0	0.1	0.0	0.0	0.0	0.2	0.1	0.1	2.0	0.2	0.5	2.8	0.4	0.4	0.2	0.5	2.6	2.6	0.1	1.3	28.9	7.8	0.1	4.0	39.6	-0.2	-17.9	**194.3**
0.4	0.1	0.0	0.0	0.0	0.1	0.1	0.0	1.1	0.8	1.8	0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.1	2.6	0.1	0.0	1.1	7.3	-0.2	7.7	**105.7**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.1	0.0	0.2	7.3	-0.0	0.9	**22.0**
0.1	0.1	0.2	0.0	0.2	1.3	0.2	0.5	8.3	0.5	1.2	0.6	1.0	0.9	0.3	0.5	0.4	0.1	0.2	0.1	6.5	0.3	1.9	9.3	23.4	-0.2	-27.4	**231.0**
1.1	0.9	1.6	0.1	2.0	13.1	4.9	0.3	1.9	2.5	2.3	3.6	4.7	6.4	1.4	4.9	4.8	0.7	2.1	1.0	43.3	0.3	4.7	135.3	201.6	-3.4	41.2	**632.5**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	0.1	0.1	0.1	0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.2	25.0	0.6	2.7	26.2	22.1	-0.0	6.1	**101.7**
0.3	0.1	0.8	0.0	0.3	2.2	1.4	1.0	0.3	0.5	2.3	3.0	2.6	7.9	1.8	6.0	2.4	3.5	1.8	1.0	125.1	3.1	0.0	17.7	1.7	-	52.4	**691.4**
0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	4.8	-	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	-	0.1	0.0	-	0.3	0.0	-0.0	2.8	**13.0**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.2	0.0	0.0	0.4	1.6	9.0	0.4	0.2	1.4	2.9	0.0	3.1	0.6	0.1	0.0	0.1	0.0	-	-7.8	**36.7**
0.6	0.4	0.3	0.0	0.4	2.6	2.9	2.0	106.7	0.6	1.4	1.2	16.1	78.0	1.7	10.8	2.9	8.7	4.5	4.1	10.5	0.5	0.3	962.9	10.9	-0.0	-22.1	**1,707.4**
15.6	4.6	1.1	0.1	1.5	9.7	3.8	4.3	20.5	5.2	4.1	16.9	7.0	3.9	3.0	4.2	12.1	7.7	1.9	0.3	952.3	42.9	27.7	212.7	462.5	-0.2	-87.2	**2,269.8**
0.2	0.0	0.3	0.0	0.4	2.3	0.1	0.4	0.2	0.2	0.7	1.1	5.2	0.8	1.7	3.0	1.9	5.6	0.9	1.0	219.7	5.1	0.3	0.6	120.0	-0.0	39.3	**421.9**
59.2	0.3	0.7	0.1	0.9	5.7	1.3	0.5	0.2	1.2	0.8	3.3	1.1	1.4	0.2	0.5	0.2	0.8	0.9	1.6	9.1	2.3	0.0	0.9	3.7	-	-126.8	**255.2**
0.4	0.4	0.0	0.0	0.1	0.4	0.0	0.2	0.0	0.1	0.6	0.8	0.3	0.0	0.7	0.8	0.3	1.0	0.4	0.6	17.9	13.3	0.0	0.2	5.9	-	-5.5	**40.5**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.6	0.6	-	0.6	-	-	4.5	**44.2**
0.5	0.1	0.5	-	0.0	0.1	0.1	0.0	-	-	-	-	-	-	-	-	-	-	-	-	4.0	0.5	-	0.2	-	-	-4.1	**3.8**
0.5	-	0.2	0.0	1.2	7.7	0.2	0.2	0.1	0.3	0.6	1.2	0.6	0.2	0.0	0.2	0.1	0.1	0.2	0.2	6.2	0.6	0.0	0.6	20.5	-0.1	3.8	**59.2**
5.7	0.2	3.2	0.2	10.3	66.3	2.2	2.1	0.5	2.3	5.2	10.3	4.8	1.4	0.3	1.8	0.6	1.3	2.1	1.5	50.1	1.6	0.2	4.1	131.5	-0.4	-47.2	**385.5**
5.0	0.4	0.3	0.0	0.3	2.3	20.1	3.9	1.0	0.9	4.2	7.7	3.8	3.0	0.4	2.7	1.4	3.0	2.5	2.0	119.8	4.1	-0.0	5.4	15.9	-0.0	-32.4	**234.8**
4.1	1.3	1.9	0.2	2.4	15.3	2.7	104.9	44.9	8.6	9.2	24.2	11.2	6.3	0.9	5.3	5.0	13.4	7.6	10.2	174.9	5.6	0.0	5.8	13.1	-0.0	-147.3	**551.5**
2.0	0.3	0.4	0.0	0.6	3.7	1.5	5.4	70.6	2.0	4.2	10.4	9.0	1.2	0.4	2.0	1.1	9.5	5.4	2.9	996.8	34.8	0.0	65.5	14.7	-0.0	127.4	**1,484.4**
2.7	1.1	2.9	0.2	3.7	23.9	0.5	1.7	1.7	9.0	3.3	4.7	3.0	6.5	0.1	1.7	1.7	2.8	1.7	1.8	8.0	2.9	0.1	2.5	21.9	-0.1	-0.6	**153.2**
0.2	0.3	0.4	0.0	0.5	3.0	2.4	12.6	0.6	1.4	31.9	13.3	8.4	12.6	0.3	0.9	3.3	5.1	4.3	2.5	8.5	33.5	0.1	53.4	15.0	-0.2	31.8	**379.0**
4.0	1.5	1.5	0.1	1.8	11.9	10.0	22.9	12.2	8.4	20.7	67.3	21.7	14.3	3.4	11.8	10.5	22.6	15.8	19.0	28.4	15.2	0.0	11.5	26.0	-0.2	-3.3	**736.9**
0.4	0.1	0.1	0.0	0.1	0.5	0.2	1.2	1.2	0.3	0.7	1.1	1.7	0.3	0.7	0.3	0.8	1.9	0.4	0.6	13.1	689.3	-0.0	2.1	3.5	-	-364.5	**375.9**
0.4	0.0	0.0	0.0	0.0	0.1	0.0	0.3	0.4	0.2	0.6	2.5	0.5	7.8	2.3	0.3	0.5	0.9	7.3	0.7	10.2	283.1	-	1.3	6.6	-	93.5	**425.7**
0.1	0.0	0.0	0.0	0.1	0.3	0.1	0.2	0.3	0.1	0.3	0.6	0.6	0.5	0.7	1.3	0.5	0.5	0.5	0.8	8.1	247.0	0.0	0.2	7.1	-	-27.9	**247.2**
0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.4	1.6	0.8	0.1	0.3	2.3	0.2	1.1	0.1	1.3	65.7	133.3	0.0	2.2	52.2	-0.0	0.3	**265.5**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.5	0.0	0.0	0.1	0.1	0.5	0.0	0.0	32.2	396.9	0.0	0.8	1.4	-	19.1	**452.6**
0.1	0.0	0.1	0.0	0.1	0.5	0.0	0.5	0.3	0.3	0.6	0.9	2.6	1.6	0.5	0.7	11.8	51.0	1.3	0.3	146.3	267.0	0.0	1.6	4.5	-0.0	47.1	**557.9**
0.3	0.1	0.2	0.0	0.3	1.9	3.5	1.6	1.0	1.2	1.6	29.2	1.7	7.2	2.4	1.4	0.4	1.5	30.1	2.5	225.8	23.5	0.0	1.3	24.7	-0.0	-149.2	**268.9**
1.1	0.1	0.0	0.0	0.1	0.3	0.2	0.7	4.1	0.2	1.0	6.3	1.7	10.5	1.0	1.4	3.3	3.5	2.0	12.2	152.3	6.9	0.0	0.7	6.0	-0.0	-10.7	**230.4**
5.8	3.6	3.5	0.3	4.6	30.2	11.3	5.3	23.4	12.7	15.9	42.5	15.4	7.7	7.4	11.7	38.0	30.2	23.4	15.7	820.3	21.8	21.0	465.0	-	189.5	-	**3,115.5**
84.4	14.3	7.8	0.5	8.6	101.8	27.3	137.2	46.9	20.7	115.3	185.5	174.7	128.8	223.0	82.8	274.6	218.3	93.5	80.0	-	-	-	-	-	-	-	**4,278.2**
17.4	8.8	9.6	0.9	10.2	25.6	102.4	121.1	894.0	54.0	89.2	178.3	28.6	69.1	-14.6	75.1	40.9	116.7	28.5	31.0	-	-	-	-	-	-	-	**4,010.3**
12.2	-4.7	-3.3	-	1.0	2.5	2.2	31.2	168.3	4.0	2.7	2.9	6.5	2.3	-1.0	9.6	0.8	1.2	4.9	2.5	499.2	46.8	0.1	55.6	55.3	-	-	**1,316.6**
21.1	4.3	8.2	0.5	5.1	33.5	31.5	85.5	51.1	12.4	47.7	76.8	32.2	30.4	5.5	17.1	17.1	31.8	20.2	24.1	-	-	-	-	-	-	-1,311.0	**641.6**
255.2	**40.5**	**44.2**	**3.8**	**59.2**	**385.5**	**234.8**	**551.5**	**1,484.4**	**153.2**	**379.0**	**736.9**	**375.9**	**425.7**	**247.2**	**265.5**	**452.6**	**557.9**	**268.9**	**230.4**	**5,476.3**	**2,308.0**	**112.8**	**2,133.7**	**3,331.4**	**-**	**-**	**34,142.2**

B.5. Gisborne Regional Table

Table B.5: 2009 I-O table of Gisborne (Million NZD)

	Industries	1 HFRG	2 SBLC	3 DAIF	4 OTHF	5 SAHF	6 FOLO	7 FISH	8 COAL	9 FUEL	10 OMIN	11 MEAT	12 DAIR	13 OFOD	14 BEVT	15 TCFL	16 WOOD	17 PAPR	18 PPRM	19 CHEM	20 RBPL	21 NMMP	22 BASM	23 FABM	24 MAEQ	25 OMFG	26 ELEC	27 WATS	28 WAST	29 CONS	30 TRDE	31 ACCR
1	**HFRG**	1.6	1.4	4.2	0.1	0.8	1.4	0.0	0.0	0.0	0.0	1.6	-	2.2	1.9	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	0.8	1.4
2	**SBLC**	2.3	20.7	8.4	0.6	1.6	1.5	0.0	0.0	0.0	0.0	46.2	-	1.3	0.6	0.7	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	3.4	0.2
3	**DAIF**	0.2	0.6	0.6	0.0	0.1	0.0	0.0	0.0	0.0	0.0	-	17.0	0.1	0.1	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	0.1	0.0
4	**OTHF**	1.6	1.9	1.5	0.5	1.0	0.2	0.0	0.0	0.0	0.0	4.9	0.3	0.4	0.1	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	0.2	0.1
5	**SAHF**	9.8	7.6	5.3	0.5	5.3	15.6	0.0	0.0	0.0	0.0	3.0	-	0.2	0.1	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.1	0.3	0.0
6	**FOLO**	0.4	0.6	1.1	0.0	0.1	46.9	0.0	0.0	0.0	0.0	0.6	-	0.0	0.1	0.0	13.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.3	0.9	0.0
7	**FISH**	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0	0.0	-	7.6	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.0	0.3	0.0
8	**COAL**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	**FUEL**	0.1	0.3	0.3	0.1	0.5	1.3	0.1	0.0	0.5	0.0	0.1	0.1	0.2	0.1	0.0	0.2	-	0.1	0.1	0.0	0.1	-	0.0	0.1	0.0	-	0.0	0.0	0.4	0.5	0.0
10	**OMIN**	0.3	0.5	0.6	0.0	0.0	0.1	0.0	0.0	0.1	0.1	-	-	-	-	-	-	-	-	0.0	0.1	1.1	-	0.0	0.0	0.0	-	0.0	0.0	0.5	0.1	-
11	**MEAT**	0.2	0.3	1.5	0.1	0.1	0.1	0.0	0.0	0.0	0.0	5.6	-	0.5	-	1.2	-	-	0.2	-	0.3	-	-	-	-	-	-	-	-	-	0.1	3.8
12	**DAIR**	-	-	-	-	-	-	-	-	0.0	-	-	0.3	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.0	0.2	0.1
13	**OFOD**	0.4	0.9	3.7	0.3	0.2	0.2	0.8	0.0	0.0	0.0	0.7	0.5	14.6	1.4	0.0	0.1	-	0.1	0.0	0.1	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.0	1.3	3.6
14	**BEVT**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.1	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.0	0.3	4.3
15	**TCFL**	0.1	0.0	0.1	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.8	0.1	-	0.1	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.3	1.1	0.0
16	**WOOD**	0.0	0.1	0.1	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	7.6	-	0.0	0.0	0.0	0.3	-	0.0	0.1	0.5	-	0.0	0.0	10.9	0.4	0.0
17	**PAPR**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	**PPRM**	0.1	0.1	0.1	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.5	0.3	0.1	0.2	-	0.7	0.0	0.2	0.1	-	0.1	0.1	0.0	-	0.0	0.0	0.3	2.9	0.2
19	**CHEM**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	**RBPL**	1.5	0.8	1.5	0.1	0.2	0.9	0.0	0.0	0.0	0.0	1.0	0.7	1.4	0.1	0.0	0.4	-	0.2	0.0	0.9	0.0	-	0.1	0.2	0.0	-	0.0	0.0	1.1	1.3	0.1
21	**NMMP**	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	-	0.0	0.0	0.0	1.5	-	0.0	0.2	0.0	-	0.0	0.0	3.5	0.2	0.0
22	**BASM**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23	**FABM**	0.3	0.3	0.4	0.0	0.1	0.6	0.0	0.0	0.0	0.0	0.2	0.1	0.4	0.9	0.0	0.2	-	0.0	0.0	0.1	0.1	-	1.0	1.2	0.0	-	0.0	0.0	1.3	1.1	0.1
24	**MAEQ**	0.2	0.3	0.5	0.0	1.0	0.4	0.4	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.1	-	0.0	0.0	0.0	0.0	-	0.1	1.2	0.0	-	0.0	0.0	1.8	1.2	0.1
25	**OMFG**	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.3	0.1	0.1
26	**ELEC**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27	**WATS**	-	-	-	-	0.2	0.0	0.0	0.0	0.0	0.0	0.5	0.1	0.0	0.1	0.0	-	-	-	-	-	-	-	-	0.0	-	-	3.9	0.0	0.0	0.3	0.0
28	**WAST**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.0	0.0	0.5	-	0.0	0.0	0.0	0.0	-	0.0	0.1	0.0	-	0.0	1.6	0.4	0.0	0.0
29	**CONS**	1.1	1.4	2.0	0.1	0.2	1.9	0.1	0.1	0.2	0.2	0.0	0.0	0.1	0.1	0.0	0.2	-	0.0	0.0	0.0	0.5	-	0.1	0.9	0.0	-	0.0	0.1	50.5	0.6	0.0
30	**TRDE**	4.2	5.1	8.0	0.5	2.9	5.6	0.5	0.0	0.0	0.0	1.7	1.2	4.0	1.5	0.7	1.2	-	0.4	0.1	0.2	0.3	-	0.4	1.3	0.1	-	-	0.1	5.6	11.1	3.0
31	**ACCR**	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.1	0.3	0.1
32	**RDFR**	2.8	1.9	1.0	0.3	1.1	28.8	0.2	0.0	0.0	0.0	2.5	2.6	3.2	0.7	0.2	2.0	-	0.3	0.2	0.4	0.9	-	0.2	0.4	0.1	-	0.0	0.0	0.6	6.6	0.0
33	**RDPS**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.0	0.1	0.0
34	**RFRT**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	**WFRT**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	**OFRT**	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	-	0.0	0.1	-
37	**OTTR**	0.3	0.2	0.1	0.0	0.3	2.0	0.2	0.0	0.0	0.0	0.7	0.1	0.7	0.1	0.0	0.3	-	0.1	0.0	0.1	0.1	-	0.0	0.1	0.0	-	0.0	0.0	0.1	2.4	0.0
38	**COMM**	0.6	0.4	0.3	0.1	0.2	0.6	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.0	0.1	-	0.1	0.0	0.1	0.1	-	0.0	0.1	0.0	-	0.0	0.0	0.4	1.4	0.1
39	**FIIN**	6.2	3.2	1.9	0.5	2.4	5.7	0.9	0.0	0.0	0.0	0.6	0.5	1.2	1.4	0.2	0.9	-	0.3	0.0	0.3	0.3	-	0.2	0.4	0.0	-	0.0	0.0	1.3	9.9	0.9
40	**HOUS**	1.2	1.0	1.6	0.0	0.3	0.5	0.0	0.0	0.0	0.0	0.2	0.2	0.3	0.1	0.1	0.2	-	0.1	0.0	0.1	0.1	-	0.1	0.2	0.0	-	0.0	0.0	0.7	5.1	0.5
41	**EHOP**	0.5	0.2	0.2	0.0	0.2	0.7	0.1	0.0	0.0	0.0	0.1	0.0	0.2	0.0	0.0	0.1	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.1	0.4	0.0
42	**SRCS**	0.7	0.5	0.3	0.0	0.6	1.1	0.1	0.0	0.1	0.0	0.4	0.3	0.4	0.4	0.0	0.1	-	0.1	0.0	0.1	0.1	-	0.1	0.3	0.0	-	0.0	0.0	0.8	2.0	0.1
43	**OBUS**	3.8	3.0	2.0	0.6	1.3	7.7	0.3	0.0	0.0	0.0	1.2	0.9	2.5	1.9	0.3	1.3	-	0.6	0.0	0.7	0.5	-	0.3	0.8	0.1	-	0.1	0.1	3.4	13.7	1.5
44	**GOVC**	0.4	0.6	0.5	0.0	0.1	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.2	0.5	0.1
45	**GOVL**	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.4	-	0.0	0.0	0.0	-	-	0.1	0.1	0.1	0.0
46	**SCHL**	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.0	0.1	0.0
47	**OEDU**	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.1	0.1	0.0
48	**HOSP**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
49	**OHCS**	0.2	0.5	1.4	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.0	0.1	0.0
50	**CULT**	0.5	0.4	0.3	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.4	0.2	0.0	0.1	-	0.2	0.0	0.1	0.1	-	0.0	0.1	0.0	-	0.0	0.0	0.1	1.8	0.2
51	**PERS**	0.1	0.1	0.2	0.0	0.3	0.7	0.1	0.0	0.0	0.0	0.7	0.5	0.1	0.1	0.1	0.0	-	0.1	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.2	0.5	0.0
	Other Imports	11.5	13.3	8.3	1.2	4.4	11.2	2.7	0.0	-	0.0	4.3	3.9	16.1	5.1	3.0	3.0	-	3.5	0.6	6.8	2.4	-	2.4	6.7	0.6	-	0.1	0.0	47.8	15.7	2.6
	Compensation of Employees	72.4	123.9	2.5	1.7	27.9	26.5	1.6	-	0.3	1.0	11.8	0.6	28.2	5.6	4.2	14.8	-	5.8	-	-	1.5	-	3.5	10.9	1.3	-	1.1	1.7	49.6	84.2	14.3
	Depreciation + Op Surplus	0.3	-48.6	46.9	1.4	11.8	42.8	2.9	0.4	2.5	-0.2	7.2	27.6	-1.2	8.5	1.1	3.0	-	2.2	0.8	6.9	8.8	-	1.5	3.6	0.2	-	5.2	1.1	18.3	20.5	8.9
	Net Indirect Taxes	0.0	-38.0	9.3	0.5	0.6	1.8	-0.0	0.1	1.6	-0.0	0.4	0.9	-0.0	19.5	0.0	0.1	-	0.1	0.0	0.4	0.7	-	0.1	0.1	0.0	-	0.1	0.0	1.6	1.4	1.2
	Domestic Import	26.6	24.7	32.0	2.9	13.2	36.9	2.9	0.3	3.5	0.5	11.1	76.7	12.3	7.6	1.7	9.7	-	4.0	1.5	6.3	7.0	-	5.0	9.4	0.7	-	1.0	0.3	23.6	47.3	6.6
	Gross Output	**152.8**	**130.5**	**148.7**	**12.5**	**79.8**	**246.6**	**16.1**	**1.0**	**9.0**	**1.7**	**108.2**	**136.2**	**98.5**	**60.4**	**14.9**	**60.2**	**-**	**19.6**	**3.4**	**24.7**	**27.2**	**-**	**15.2**	**39.0**	**3.8**	**-**	**11.7**	**5.4**	**226.6**	**242.7**	**54.6**

Table B.5: 2009 I-O table of Gisborne (Million NZD) – Continuation (right hand side)

32 RDFR	33 RDPS	34 RFRT	35 WFRT	36 OFRT	37 OTTR	38 COMM	39 FIIN	40 HOUS	41 EHOP	42 SRCS	43 OBUS	44 GOVC	45 GOVL	46 SCHL	47 OEDU	48 HOSP	49 OHCS	50 CULT	51 PERS	Private Consumption	Government Consumption	Stock Change	Gross Investment	Exports	Import Adjustments	Final Demand	Gross Output
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	3.6	0.1	-0.2	0.5	67.2	-0.0	63.7	**152.8**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.5	0.0	0.0	0.1	5.9	-0.0	36.2	**130.5**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.8	-	128.8	**148.7**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.1	0.0	0.1	1.8	-0.0	-3.7	**12.5**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.6	0.2	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.2	0.1	0.0	7.2	2.2	-0.0	21.0	**79.8**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	21.2	2.7	55.4	-0.0	101.4	**246.6**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.5	-0.0	3.4	**16.1**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.0	-	0.0	0.2	-	0.7	**1.0**
0.1	0.0	-	-	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.1	0.1	0.0	0.0	13.3	0.4	-0.0	1.0	2.2	-4.7	-9.7	**9.0**
0.0	0.0	-	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0	0.4	-0.0	-2.4	**1.7**
-	-	-	-	0.0	0.0	-	-	-	-	-	-	0.1	-	0.0	0.1	0.1	0.0	0.0	0.0	18.7	0.6	-	0.1	60.1	-0.0	14.7	**108.2**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	10.0	0.2	-2.1	0.1	118.2	-	8.9	**136.2**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.1	0.0	21.0	0.2	-0.1	0.3	35.3	-0.0	12.3	**98.5**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	23.4	0.6	0.2	0.0	15.8	-0.0	14.4	**60.4**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	3.5	0.1	0.2	0.1	6.5	-0.0	0.6	**14.9**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.2	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.1	0.4	0.5	20.0	-0.0	16.8	**60.2**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.6	0.1	-	-	-	-	-2.7	**-**
0.0	0.0	-	-	0.0	0.1	0.1	0.3	0.2	0.1	0.3	1.6	0.4	0.0	0.2	0.3	0.1	0.3	0.1	0.4	4.0	0.1	0.1	0.1	1.5	-0.0	2.4	**19.6**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.8	0.0	0.0	0.0	0.4	-0.0	2.1	**3.4**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.2	0.1	0.0	0.0	0.1	0.3	0.3	0.0	0.1	4.6	1.3	0.0	0.5	5.0	-0.0	-0.8	**24.7**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.3	1.9	-0.1	18.1	**27.2**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.0	-	-	-	-	-0.2	**-**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.5	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.1	0.1	0.6	1.5	-0.0	2.1	**15.2**
0.0	0.0	-	-	0.0	0.5	0.2	0.0	0.1	0.2	0.1	0.2	0.6	0.4	0.1	0.4	0.3	0.0	0.1	0.1	6.9	0.0	0.3	8.4	12.4	-0.2	-0.2	**39.0**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.1	0.1	1.0	0.8	-0.0	-3.5	**3.8**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19.9	0.5	-	-	-	-	-20.4	**-**
0.0	0.0	-	-	0.0	0.0	-	0.0	2.3	-	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	-	0.3	0.0	-0.0	3.3	**11.7**
0.0	0.0	-	-	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.4	1.1	0.1	0.0	0.2	0.4	0.0	0.5	0.1	0.0	0.0	0.0	0.0	-	-0.9	**5.4**
0.0	0.0	-	-	0.0	0.2	0.3	0.3	15.8	0.1	0.2	0.1	4.2	9.5	0.3	2.0	0.4	1.3	0.4	0.6	1.7	0.1	0.0	127.8	1.4	-0.0	-0.8	**226.6**
1.0	0.3	-	-	0.0	0.6	0.3	0.4	2.4	0.7	0.4	1.5	1.4	0.4	0.4	0.6	1.4	0.9	0.1	0.0	151.2	7.3	3.0	22.7	49.4	-0.0	-63.7	**242.7**
0.0	0.0	-	-	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	1.0	0.1	0.2	0.4	0.2	0.6	0.1	0.1	34.9	0.9	0.0	0.1	15.5	-0.0	-1.0	**54.6**
4.8	0.0	-	-	0.0	0.5	0.1	0.1	0.0	0.2	0.1	0.4	0.3	0.2	0.0	0.1	0.0	0.1	0.1	0.2	1.4	0.4	0.0	0.1	0.3	-	-46.0	**20.5**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.2	0.2	0.1	0.2	0.1	0.1	2.8	2.3	0.0	0.0	0.5	-	-4.0	**3.3**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.4	0.1	-	-	-	-	-1.5	**-**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6	0.1	-	-	-	-	-0.7	**-**
0.0	-	-	-	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.1	0.0	0.0	0.7	-0.0	-0.4	**2.0**
0.2	0.0	-	-	0.2	2.5	0.1	0.1	0.0	0.2	0.3	0.6	0.6	0.1	0.0	0.2	0.0	0.1	0.1	0.1	8.0	0.3	0.0	0.3	10.6	-0.0	-1.4	**31.0**
0.2	0.0	-	-	0.0	0.1	1.1	0.3	0.1	0.1	0.3	0.5	0.6	0.2	0.0	0.3	0.1	0.3	0.1	0.2	19.0	0.7	-0.0	0.5	1.5	-0.0	-9.4	**21.8**
0.4	0.1	-	-	0.1	1.4	0.3	15.1	7.5	1.7	1.2	3.2	3.3	0.9	0.2	1.1	0.8	2.2	0.8	1.7	27.8	0.9	0.0	0.7	1.7	-0.0	-41.5	**71.0**
0.1	0.0	-	-	0.0	0.3	0.1	0.6	8.9	0.3	0.4	1.0	2.0	0.1	0.1	0.3	0.1	1.2	0.4	0.4	158.3	5.9	0.0	9.7	2.2	-0.0	15.1	**220.2**
0.1	0.0	-	-	0.0	0.8	0.0	0.1	0.1	0.6	0.2	0.2	0.3	0.3	0.0	0.1	0.1	0.2	0.1	0.1	1.3	0.5	0.0	0.4	4.0	-0.0	15.1	**27.6**
0.0	0.0	-	-	0.0	0.2	0.1	1.1	0.1	0.2	2.5	1.0	1.5	1.0	0.0	0.1	0.3	0.5	0.3	0.2	1.4	5.7	0.0	6.3	1.8	-0.0	11.4	**44.5**
0.3	0.1	-	-	0.1	0.8	0.8	2.6	1.6	1.3	2.1	7.0	5.1	1.5	0.6	1.9	1.4	3.0	1.4	2.5	4.5	2.6	0.0	1.3	3.1	-0.0	-7.8	**86.5**
0.0	0.0	-	-	0.0	0.0	0.0	0.2	0.2	0.0	0.1	0.1	0.5	0.0	0.1	0.1	0.1	0.3	0.0	0.1	2.1	117.0	-0.0	0.6	0.9	-	-26.7	**99.2**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.3	0.1	0.8	0.4	0.1	0.1	0.1	0.6	0.1	1.6	48.0	-	0.2	0.8	-	-2.5	**51.7**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	1.3	41.9	0.0	0.0	1.3	-	-1.0	**45.3**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.0	0.1	0.5	0.0	0.2	0.0	0.2	10.4	22.6	0.0	0.4	9.6	-0.0	3.6	**48.7**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	5.1	67.3	0.0	0.1	0.2	-	-5.6	**67.5**
0.0	0.0	-	-	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.7	0.2	0.1	0.1	1.8	7.6	0.1	0.1	23.2	45.3	0.0	0.2	0.7	-0.0	0.1	**83.2**
0.0	0.0	-	-	0.0	0.1	0.2	0.1	0.1	0.1	0.1	2.3	0.3	0.6	0.3	0.2	0.0	0.2	2.0	0.3	35.9	4.0	0.0	0.1	2.4	-0.0	-28.6	**26.1**
0.1	0.0	-	-	0.0	0.0	0.0	0.1	0.5	0.0	0.1	0.6	0.4	1.1	0.2	0.2	0.4	0.4	0.2	1.5	24.2	1.2	0.0	0.1	0.9	-0.0	-2.4	**33.6**
0.5	0.3	-	-	0.2	2.4	1.0	0.7	3.5	2.3	1.9	5.0	4.1	0.9	1.3	2.2	5.7	4.5	2.3	2.3	130.2	3.1	3.0	65.7	-	5.1	-	**425.3**
16.3	3.6	-	-	0.3	7.3	2.9	23.2	6.2	1.0	13.1	35.0	34.8	14.2	45.8	18.7	58.5	34.8	12.9	13.2	-	-	-	-	-	-	-	**838.5**
-4.2	-4.6	-	-	0.3	2.9	9.1	11.2	133.3	12.3	10.9	7.9	16.8	9.8	-7.3	10.6	-11.1	15.2	-0.4	3.1	-	-	-	-	-	-	-	**400.1**
-2.9	2.5	-	-	0.0	0.3	0.2	2.9	25.1	0.9	0.3	0.1	3.8	0.3	-0.5	1.4	-0.2	0.2	-0.1	0.2	79.3	6.6	0.0	7.9	7.8	-	-	**138.7**
3.2	0.7	-	-	0.6	9.3	4.6	11.2	10.0	4.4	8.9	14.8	14.4	7.2	2.1	6.0	5.0	7.7	3.9	5.0	-	-	-	-	-	-	-206.6	**287.4**
20.5	**3.3**	**-**	**-**	**2.0**	**31.0**	**21.8**	**71.0**	**220.2**	**27.6**	**44.5**	**86.5**	**99.2**	**51.7**	**45.3**	**48.7**	**67.5**	**83.2**	**26.1**	**33.6**	**869.5**	**389.6**	**26.5**	**269.2**	**535.1**	-	-	**5,024.6**

B.6. Hawke's Bay Regional Table

Table B.6: 2009 I-O table of Hawkes’s Bay (Million NZD)

Industries		1 HFRG	2 SBLC	3 DAIF	4 OTHF	5 SAHF	6 FOLO	7 FISH	8 COAL	9 FUEL	10 OMIN	11 MEAT	12 DAIR	13 OFOD	14 BEVT	15 TCFL	16 WOOD	17 PAPR	18 PPRM	19 CHEM	20 RBPL	21 NMMP	22 BASM	23 FABM	24 MAEQ	25 OMFG	26 ELEC	27 WATS	28 WAST	29 CONS	30 TRDE	31 ACCR
1	HFRG	7.3	7.3	21.8	0.4	1.2	1.8	0.0	0.0	0.0	0.0	14.5	-	19.1	16.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.1	3.4	4.7
2	SBLC	10.2	107.8	43.5	3.6	2.5	1.9	0.0	0.0	0.0	0.0	409.6	-	11.4	5.1	7.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	15.1	0.6
3	DAIF	1.6	6.2	5.4	0.3	0.3	0.1	0.0	0.0	0.0	0.0	-	278.7	1.1	0.9	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.5	0.1
4	OTHF	8.2	10.9	8.8	3.5	1.7	0.3	0.0	0.0	0.0	0.0	48.5	3.3	4.2	1.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.8	0.3
5	SAHF	43.8	39.5	27.4	2.7	8.1	20.1	0.0	0.0	0.0	0.0	26.5	-	1.6	0.5	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	1.2	0.0
6	FOLO	2.0	3.2	5.8	0.3	0.1	60.4	0.0	0.0	0.0	0.0	5.0	-	0.2	0.6	0.2	52.2	14.3	0.1	0.1	0.0	0.0	0.0	0.1	0.2	0.2	0.0	0.0	0.0	1.1	4.0	0.0
7	FISH	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	-	20.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0
8	COAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	FUEL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	OMIN	1.1	2.1	2.9	0.2	0.0	0.1	0.0	0.2	1.1	0.4	-	-	-	-	-	-	-	-	0.1	0.1	3.3	0.2	0.3	0.1	0.2	-	0.0	0.1	1.6	0.2	-
11	MEAT	1.0	2.0	8.8	0.8	0.1	0.1	0.2	0.0	0.0	0.1	57.8	-	4.8	-	13.3	-	-	1.0	-	0.8	-	-	-	-	-	-	-	-	-	0.4	14.4
12	DAIR	-	-	-	-	-	-	-	-	0.0	-	-	0.8	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1
13	OFOD	1.9	4.8	19.5	1.7	0.4	0.2	2.1	0.0	0.0	0.0	6.1	4.5	129.1	12.0	0.2	0.5	0.5	0.3	0.1	0.2	0.1	0.0	0.2	0.3	0.1	0.0	0.0	0.0	0.1	5.6	11.8
14	BEVT	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	9.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	14.0
15	TCFL	0.3	0.1	0.7	0.0	0.2	0.3	0.0	0.0	0.0	0.0	0.1	0.1	0.5	0.4	8.2	0.4	0.2	0.4	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.0	0.0	0.0	1.2	5.0	0.0
16	WOOD	0.2	0.3	0.4	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.8	0.1	26.7	4.2	0.2	0.0	0.1	1.0	0.0	0.4	0.4	9.5	0.0	0.0	0.0	32.4	1.6	0.0
17	PAPR	10.4	0.4	0.4	0.2	0.1	0.2	0.0	0.0	0.0	0.0	0.5	0.4	1.2	2.7	0.1	1.5	39.8	4.1	0.1	0.6	0.4	0.0	0.0	0.3	0.4	0.6	0.0	0.0	1.0	4.8	0.2
18	PPRM	0.3	0.4	0.1	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.9	0.7	2.3	1.4	0.3	0.5	1.6	1.7	0.1	0.2	0.2	0.0	0.3	0.5	0.3	0.2	0.0	0.0	0.5	6.5	0.3
19	CHEM	25.2	44.4	71.9	3.8	4.1	6.4	0.1	0.0	0.5	0.0	3.8	2.7	3.4	0.9	0.5	8.2	8.9	0.3	26.0	6.5	0.5	0.0	1.8	2.2	0.9	0.2	0.0	0.0	1.2	6.1	0.1
20	RBPL	4.3	2.9	5.0	0.5	0.2	0.7	0.0	0.0	0.1	0.0	5.7	4.2	7.9	0.8	0.3	0.9	0.7	0.6	0.3	1.5	0.1	0.0	0.5	1.1	0.4	0.0	0.0	0.0	2.4	3.7	0.3
21	NMMP	0.4	0.6	0.8	0.1	0.0	0.1	0.0	0.0	0.3	0.0	0.1	0.0	0.5	3.9	0.0	0.2	0.1	0.0	0.0	0.0	8.4	0.0	0.6	2.6	0.2	0.0	0.0	0.0	18.8	1.3	0.0
22	BASM	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.3	0.2	0.2	0.1	0.0	0.1	0.3	0.0	0.0	0.0	0.1	0.1	1.4	1.0	0.2	0.0	0.0	0.0	0.2	1.1	0.0
23	FABM	2.6	3.6	4.9	0.4	0.4	1.8	0.2	0.0	0.2	0.0	3.7	2.7	6.6	16.8	0.8	1.9	2.9	0.3	0.6	0.6	1.0	0.5	20.9	18.3	2.3	0.5	0.0	0.1	9.4	10.5	1.0
24	MAEQ	1.3	1.9	3.4	0.2	1.8	0.6	1.4	0.0	0.8	0.0	0.8	0.6	1.4	1.3	0.3	0.3	0.7	0.2	0.2	0.1	0.1	0.0	0.9	10.6	0.2	1.7	0.0	0.1	7.5	6.4	0.5
25	OMFG	0.1	0.2	0.3	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.9	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.4	0.7	2.0	0.0	0.0	0.0	2.1	1.3	0.5
26	ELEC	14.1	4.0	11.0	1.2	0.2	0.8	0.2	0.1	0.7	0.3	12.4	6.6	8.1	2.0	1.0	4.8	20.6	0.5	1.5	0.5	1.6	1.0	1.0	1.5	0.6	136.9	0.5	0.1	1.2	10.5	4.0
27	WATS	-	-	-	-	0.1	0.0	0.0	0.0	0.0	0.0	1.4	0.4	0.1	0.4	0.0	-	0.0	-	-	-	-	-	-	0.0	-	0.0	1.1	0.0	0.0	0.4	0.0
28	WAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	1.9	1.5	0.0	0.1	1.8	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.4	0.1	0.0	0.0	6.1	1.4	0.1	0.0
29	CONS	4.4	6.5	9.0	0.7	0.3	2.1	0.3	0.5	3.2	0.8	0.3	0.2	0.4	0.8	0.3	0.8	1.7	0.1	0.1	0.1	1.6	0.0	0.6	5.7	0.2	18.6	0.0	0.3	148.8	2.3	0.1
30	TRDE	20.2	28.9	44.6	3.2	4.8	7.8	1.4	0.1	0.8	0.2	16.1	11.9	37.9	14.8	7.3	5.3	9.6	1.8	2.0	0.6	1.1	0.4	3.9	10.6	2.0	1.6	-	0.4	20.2	53.3	10.5
31	ACCR	0.4	0.3	0.4	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.3	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.1	0.0	0.0	0.5	1.5	0.3
32	RDFR	11.3	9.1	4.7	1.5	1.5	34.3	0.4	0.1	0.2	0.1	20.6	21.2	25.8	6.1	2.0	7.4	5.5	1.3	5.1	1.0	2.9	0.3	1.7	2.8	1.3	0.1	0.0	0.1	1.9	27.2	0.1
33	RDPS	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1
34	RFRT	0.4	0.5	0.3	0.1	-	1.4	-	0.2	-	0.1	2.5	0.9	1.5	0.5	0.2	0.4	1.5	0.1	0.6	0.1	0.2	0.0	0.2	0.3	0.2	-	-	-	0.1	0.4	-
35	WFRT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	OFRT	0.3	0.2	0.2	0.0	0.1	0.7	0.2	0.0	0.0	-	1.6	0.2	1.7	0.2	0.1	0.3	0.9	0.1	0.2	0.1	0.0	0.0	0.1	0.2	0.1	0.0	-	-	0.1	2.9	-
37	OTTR	1.7	1.3	0.9	0.3	0.6	3.8	0.9	0.0	0.4	0.0	9.9	1.2	9.3	1.3	0.7	1.8	5.5	0.4	1.0	0.3	0.3	0.0	0.4	1.3	0.4	0.2	0.0	0.0	0.6	15.7	0.1
38	COMM	3.6	2.9	2.0	0.8	0.4	1.1	0.1	0.0	0.1	0.0	1.4	1.0	2.1	0.9	0.3	0.6	0.8	0.5	0.3	0.2	0.3	0.0	0.4	1.1	0.3	0.5	0.0	0.1	1.9	8.8	0.5
39	FIIN	19.7	12.0	7.2	2.0	2.7	5.2	1.7	0.0	0.4	0.0	3.9	2.9	7.8	8.6	1.2	2.6	2.2	1.0	0.8	0.6	0.7	0.3	1.2	2.2	0.7	2.7	0.0	0.1	3.1	31.7	2.1
40	HOUS	6.3	6.1	9.6	0.1	0.5	0.8	0.1	0.0	0.1	0.0	2.4	1.7	3.1	1.2	1.0	0.9	0.4	0.6	0.3	0.3	0.3	0.0	1.1	1.6	0.8	2.0	0.0	0.1	2.6	26.4	1.8
41	EHOP	4.8	2.4	2.0	0.3	0.8	2.0	0.7	0.0	0.1	0.1	1.3	0.9	3.1	0.5	0.2	0.9	0.5	0.3	0.4	0.1	0.2	0.0	0.3	0.8	0.2	0.9	0.0	0.1	0.8	3.8	0.3
42	SRCS	3.4	2.8	1.9	0.2	0.9	1.5	0.3	0.0	1.2	0.0	4.0	3.0	3.4	3.7	0.3	0.6	3.8	0.4	0.7	0.3	0.5	0.1	1.0	2.7	0.3	11.4	0.0	0.0	3.0	9.7	0.5
43	OBUS	18.9	17.5	11.8	4.1	2.3	11.1	1.0	0.1	0.8	0.1	12.4	9.1	25.0	19.3	3.5	5.7	4.0	2.9	1.7	1.9	2.1	0.1	3.2	6.8	2.0	5.7	0.1	0.3	12.7	68.3	5.5
44	GOVC	1.8	3.2	2.6	0.2	0.1	0.8	0.1	0.0	0.0	0.0	0.3	0.2	0.5	0.2	0.1	1.1	0.3	0.1	0.0	0.0	0.1	0.0	0.1	0.2	0.2	0.1	0.0	0.0	0.6	2.5	0.2
45	GOVL	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.2	0.2	0.1	0.3	0.1	0.1	0.1	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.1	0.0	-	-	0.3	0.2	0.3	0.0
46	SCHL	0.2	0.3	0.3	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.1	0.3	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.3	0.0	0.0	0.1	0.5	0.1
47	OEDU	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.2	0.0
48	HOSP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
49	OHCS	0.7	2.6	7.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.4	0.0	0.1	0.4	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.6	0.0
50	CULT	2.3	2.1	1.5	0.3	0.5	0.2	0.0	0.0	0.0	0.0	1.9	1.4	3.8	2.2	0.3	0.4	0.3	0.8	0.1	0.4	0.4	0.0	0.2	0.7	0.2	0.3	0.0	0.0	0.4	8.4	0.7
51	PERS	0.3	0.3	0.8	0.0	0.4	0.9	0.2	0.0	0.0	0.0	6.1	4.5	1.2	1.1	0.5	0.1	0.1	0.5	0.1	0.1	0.0	0.0	0.2	0.3	0.0	0.8	0.0	0.0	0.8	2.1	0.1
	Other Imports	51.4	69.4	43.1	7.0	6.8	14.4	7.2	0.0	-	0.2	38.5	34.9	142.9	45.0	29.1	11.8	29.8	15.7	18.3	16.8	8.2	0.9	24.8	49.2	14.2	2.2	0.1	0.1	161.2	69.6	8.6
	Compensation of Employees	166.4	169.0	16.1	12.3	114.3	40.2	1.1	-	-	3.0	131.9	0.6	111.9	27.2	39.5	22.6	41.8	12.1	7.7	9.2	10.5	0.8	30.9	50.8	15.6	21.0	1.0	7.3	172.7	361.2	63.2
	Depreciation + Op Surplus	137.7	14.2	241.9	6.4	-50.1	49.3	10.9	2.0	43.6	0.8	37.4	249.5	122.4	81.6	11.4	47.3	59.2	22.8	19.7	8.4	25.4	4.8	21.2	54.6	16.9	91.7	4.2	3.3	56.7	103.2	14.6
	Net Indirect Taxes	20.1	11.1	47.8	2.5	-2.4	2.1	-0.1	0.3	28.4	0.1	2.0	8.5	4.5	188.1	0.3	1.9	2.1	1.1	0.6	0.5	1.9	0.1	1.1	1.1	0.6	1.7	0.0	0.1	5.0	7.2	2.0
	Domestic Import	68.0	74.7	75.9	11.1	15.7	39.8	10.5	1.6	63.9	2.4	64.9	544.4	136.2	51.8	11.5	27.0	39.6	14.3	21.4	8.0	18.4	2.9	36.1	50.8	12.2	69.8	2.5	1.1	87.6	178.1	14.1
	Gross Output	**680.7**	**680.2**	**775.1**	**73.3**	**122.3**	**317.4**	**43.0**	**5.6**	**147.2**	**9.1**	**959.1**	**1,206.5**	**873.1**	**535.0**	**143.5**	**241.0**	**305.1**	**86.9**	**110.8**	**60.6**	**93.7**	**12.7**	**158.1**	**285.0**	**86.6**	**372.3**	**9.8**	**20.3**	**764.1**	**1,078.5**	**178.2**

Table B.6: 2009 I-O table of Hawkes's Bay (Million NZD) – Continuation (right hand side)

32 RDFR	33 RDPS	34 RFRT	35 WFRT	36 OFRT	37 OTTR	38 COMM	39 FIIN	40 HOUS	41 EHOP	42 SRCS	43 OBUS	44 GOVC	45 GOVL	46 SCHL	47 OEDU	48 HOSP	49 OHCS	50 CULT	51 PERS	Private Consumption	Government Consumption	Stock Change	Gross Investment	Exports	Import Adjustments	Final Demand	Gross Output
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.3	0.1	0.1	0.1	0.1	0.0	0.0	0.0	1.3	0.0	0.0	0.0	13.8	0.3	-0.9	2.2	299.4	-0.0	265.6	**680.7**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.2	0.0	2.1	0.0	0.2	0.4	30.9	-0.0	27.3	**680.2**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.2	0.0	0.5	3.9	-	474.2	**775.1**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.0	5.0	0.3	0.0	0.3	10.4	-0.0	-35.6	**73.3**
0.2	0.0	0.0	-	0.1	0.3	0.0	0.1	0.0	0.3	0.0	2.5	0.6	0.1	0.0	0.0	0.0	0.4	0.2	0.1	0.8	0.5	0.0	11.0	3.4	-0.0	-70.6	**122.3**
0.3	0.0	0.0	-	0.0	0.1	0.0	0.0	0.1	0.0	0.0	4.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.1	27.2	3.4	71.3	-0.0	58.5	**317.4**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.4	0.0	6.6	-0.0	12.8	**43.0**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	0.0	-	0.2	0.9	-	4.0	**5.6**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	51.2	1.4	-0.4	16.5	36.8	-76.5	118.2	**147.2**
0.1	0.0	0.1	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-	-	-	-	0.2	0.1	0.0	0.2	2.0	-0.1	-7.7	**9.1**
-	-	-	-	0.0	0.0	-	-	-	-	-	-	0.3	-	0.0	0.2	0.2	0.0	0.1	0.0	72.1	2.0	-	0.8	532.5	-0.0	245.4	**959.1**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	38.8	0.8	-18.5	1.1	1,047.6	-	135.3	**1,206.5**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.1	1.7	0.1	0.2	0.0	80.9	0.6	-0.7	2.4	312.4	-0.0	272.6	**873.1**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	90.4	1.9	1.8	0.3	139.9	-0.0	274.2	**535.0**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.1	0.3	0.1	0.1	0.2	0.1	0.0	0.1	0.0	13.6	0.3	1.8	0.6	62.5	-0.0	42.9	**143.5**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.7	0.0	1.2	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.5	1.2	0.3	1.7	1.9	80.2	-0.0	73.4	**241.0**
0.1	0.0	0.0	-	0.1	0.3	0.0	0.1	2.7	0.0	0.4	3.8	0.0	0.0	0.1	0.1	0.1	0.4	0.0	0.0	10.0	0.3	0.2	0.2	119.9	-0.0	95.6	**305.1**
0.1	0.0	0.0	-	0.1	0.4	0.4	0.8	0.4	0.2	0.6	3.2	0.6	0.1	0.2	0.4	0.2	0.5	0.3	0.7	15.6	0.3	0.4	0.5	6.5	-0.0	34.6	**86.9**
0.5	0.1	0.1	-	0.3	0.8	0.0	0.0	0.1	0.1	0.1	0.3	0.2	0.2	0.1	0.2	1.0	0.9	0.0	0.4	3.1	0.1	0.1	0.1	14.7	-0.1	-143.5	**110.8**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.4	0.1	0.1	0.6	0.1	0.1	0.0	0.1	0.6	0.6	0.0	0.3	17.7	4.4	0.0	1.3	12.4	-0.1	-23.4	**60.6**
0.2	0.1	0.0	-	0.0	0.0	0.0	0.0	0.5	0.4	0.7	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.1	1.6	0.0	0.0	1.0	6.5	-0.2	43.5	**93.7**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.1	4.2	-0.0	1.6	**12.7**
0.0	0.0	0.0	-	0.2	0.5	0.1	0.3	3.6	0.3	0.5	0.2	0.7	0.4	0.1	0.3	0.2	0.0	0.0	0.0	4.0	0.2	1.3	6.4	16.0	-0.1	7.2	**158.1**
0.3	0.3	0.3	-	1.3	3.6	1.5	0.1	0.5	0.8	0.6	0.9	2.1	2.1	0.4	1.5	1.4	0.2	0.4	0.3	26.6	0.2	2.1	61.0	90.8	-1.5	41.6	**285.0**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	1.9	0.1	0.0	0.1	0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.1	15.3	0.3	2.3	22.4	18.8	-0.0	15.1	**86.6**
0.1	0.1	0.2	-	0.4	1.0	0.7	0.6	0.2	0.2	0.9	1.3	1.8	4.2	0.9	3.0	1.2	1.7	0.6	0.5	76.7	1.7	0.0	9.5	0.9	-	14.6	**372.3**
0.0	0.0	0.0	-	0.0	0.0	-	0.0	2.6	-	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	-	0.3	0.0	-0.0	2.0	**9.8**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.4	0.1	0.0	0.0	0.2	1.3	5.3	0.2	0.1	0.7	1.5	0.0	1.7	0.4	0.0	0.0	0.0	0.0	-	-7.2	**20.3**
0.3	0.2	0.1	-	0.4	1.1	1.4	1.1	47.4	0.3	0.6	0.5	11.0	39.9	0.8	5.3	1.4	4.0	1.3	2.0	6.4	0.3	0.1	430.9	4.9	-0.0	-8.0	**764.1**
6.4	1.9	0.3	-	1.5	4.0	1.8	2.2	8.8	2.5	1.6	6.5	4.6	1.9	1.4	2.0	5.4	3.5	0.5	0.1	584.0	24.2	13.1	101.1	219.7	-0.1	-243.4	**1,078.5**
0.1	0.0	0.1	-	0.3	0.9	0.0	0.2	0.1	0.1	0.2	0.4	3.2	0.4	0.8	1.3	0.8	2.3	0.2	0.4	134.7	2.9	0.1	0.2	50.7	-0.0	-27.5	**178.2**
26.8	0.1	0.2	-	0.9	2.6	0.7	0.3	0.1	0.6	0.3	1.4	0.8	0.8	0.1	0.2	0.1	0.4	0.3	0.8	5.6	1.3	0.0	0.4	1.8	-	-119.2	**125.2**
0.2	0.2	0.0	-	0.1	0.2	0.0	0.1	0.0	0.1	0.3	0.3	0.3	0.0	0.4	0.5	0.1	0.5	0.1	0.3	11.0	7.5	0.0	0.1	2.9	-	-6.3	**19.9**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.3	0.3	-	0.2	-	-	-4.7	**13.9**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.5	0.3	-	-	-	-	-2.7	
0.3	-	0.1	-	1.5	4.2	0.2	0.2	0.0	0.2	0.3	0.6	0.5	0.1	0.0	0.1	0.0	0.1	0.1	0.1	3.8	0.3	0.0	0.7	23.7	-0.1	20.7	**68.3**
2.0	0.1	0.7	-	8.4	23.0	0.9	0.9	0.2	0.9	1.7	3.3	2.7	0.6	0.1	0.7	0.2	0.5	0.5	0.6	30.7	0.9	0.1	2.0	64.5	-0.2	-17.4	**189.0**
2.1	0.2	0.1	-	0.3	1.0	9.8	2.1	0.4	0.4	1.7	3.0	2.6	1.5	0.2	1.3	0.7	1.4	0.7	1.0	73.5	2.3	-0.0	3.0	9.0	-0.0	-19.3	**132.1**
1.6	0.5	0.5	-	2.2	6.0	1.2	52.8	18.3	4.0	3.4	8.8	7.1	3.0	0.4	2.4	2.1	5.7	2.0	4.5	107.2	3.1	0.0	3.6	8.2	-0.0	-30.4	**345.6**
1.0	0.2	0.1	-	0.6	1.8	0.8	3.4	35.9	1.1	1.9	4.7	7.1	0.7	0.2	1.1	0.6	5.0	1.8	1.6	611.3	19.6	0.0	33.3	7.4	-0.0	-59.1	**754.3**
1.1	0.5	0.8	-	3.7	10.3	0.2	0.9	0.8	4.6	1.3	1.9	2.1	3.4	0.1	0.8	0.8	1.3	0.5	0.9	4.9	1.6	0.1	1.4	12.7	-0.0	3.2	**88.6**
0.1	0.1	0.1	-	0.4	1.0	1.0	5.6	0.2	0.6	10.3	4.3	4.7	5.2	0.1	0.4	1.3	1.9	1.0	1.0	5.2	18.9	0.1	24.3	6.8	-0.1	16.1	**172.3**
1.9	0.7	0.5	-	2.1	5.8	5.6	14.3	6.2	4.8	9.4	30.5	16.9	8.3	1.9	6.6	5.5	12.0	5.2	10.5	17.4	8.6	0.0	5.2	11.8	-0.1	-116.6	**335.1**
0.2	0.0	0.0	-	0.1	0.3	0.1	0.9	0.7	0.2	0.3	0.6	1.5	0.2	0.5	0.2	0.5	1.2	0.2	0.4	8.0	388.3	-0.0	1.6	2.8	-	-129.5	**295.0**
0.2	0.0	0.0	-	0.0	0.1	0.0	0.2	0.2	0.1	0.3	1.2	0.4	4.6	1.3	0.2	0.2	0.5	2.4	0.4	6.2	159.5	-	0.8	3.9	-	62.8	**249.3**
0.0	0.0	0.0	-	0.1	0.2	0.1	0.1	0.2	0.0	0.1	0.3	0.5	0.3	0.4	0.7	0.2	0.2	0.2	0.4	5.0	139.2	0.0	0.1	3.9	-	-17.7	**137.9**
0.0	0.0	0.0	-	0.0	0.0	0.1	0.1	0.0	0.0	0.2	0.5	0.5	0.0	0.1	1.0	0.1	0.4	0.0	0.6	40.3	75.1	0.0	1.2	29.1	-0.0	-2.6	**148.1**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.4	0.0	0.0	0.0	0.1	0.2	0.0	0.0	19.8	223.6	0.0	0.4	0.7	-	-5.2	**240.6**
0.1	0.0	0.0	-	0.1	0.2	0.0	0.3	0.2	0.1	0.3	0.4	2.1	0.9	0.3	0.4	6.3	27.1	0.4	0.2	89.7	150.4	0.0	0.9	2.4	-0.0	0.4	**296.5**
0.1	0.0	0.1	-	0.3	0.7	1.4	0.7	0.4	0.5	0.5	9.7	1.0	3.1	1.0	0.6	0.1	0.6	7.4	1.0	138.5	13.2	0.0	0.4	8.2	-0.0	-129.7	**89.6**
0.5	0.0	0.0	-	0.1	0.1	0.1	0.4	1.7	0.1	0.4	2.4	1.1	5.2	0.5	0.7	1.5	1.6	0.6	5.7	93.4	3.9	0.0	0.4	3.3	-0.0	-17.9	**127.2**
2.8	1.8	1.1	-	5.3	14.8	6.3	3.3	11.9	7.3	7.2	19.3	12.1	4.5	4.1	6.5	20.2	16.0	7.8	8.7	503.1	14.9	14.4	319.2	-	79.3	-	**2,013.5**
43.9	9.7	2.9	-	11.6	49.0	17.4	75.5	27.1	10.6	58.1	103.3	149.8	63.6	151.6	45.7	156.1	126.6	48.2	49.4	-	-	-	-	-		-	**2,861.8**
7.1	-1.6	2.4	-	10.2	13.4	55.6	84.3	451.5	32.5	35.1	62.5	12.1	52.0	-33.7	42.4	11.8	51.5	-5.0	12.2	-	-	-	-	-		-	**2,409.3**
5.0	0.8	-0.8	-	1.0	1.3	1.2	21.7	85.0	2.4	1.1	1.0	2.7	1.8	-2.2	5.4	0.2	0.5	-0.9	1.0	306.1	32.1	0.1	38.2	38.0	-	-	**883.4**
19.4	3.8	3.9	-	14.3	39.7	23.2	71.3	40.9	11.3	30.4	49.8	38.7	33.8	5.1	15.1	14.9	24.5	11.5	18.7	-	-	-	-	-	-	-1,118.4	**1,108.3**
125.2	**19.9**	**13.9**	**-**	**68.3**	**189.0**	**132.1**	**345.6**	**754.3**	**88.6**	**172.3**	**335.1**	**295.0**	**249.3**	**137.9**	**148.1**	**240.6**	**296.5**	**89.6**	**127.2**	**3,358.3**	**1,308.6**	**47.3**	**1,114.4**	**3,447.7**	-	-	**23,539.7**

B.7. Taranaki Regional Table

Table B.7: 2009 I-O table of Taranaki (Million NZD)

	Industries	1 HFRG	2 SBLC	3 DAIF	4 OTHF	5 SAHF	6 FOLO	7 FISH	8 COAL	9 FUEL	10 OMIN	11 MEAT	12 DAIR	13 OFOD	14 BEVT	15 TCFL	16 WOOD	17 PAPR	18 PPRM	19 CHEM	20 RBPL	21 NMMP	22 BASM	23 FABM	24 MAEQ	25 OMFG	26 ELEC	27 WATS	28 WAST	29 CONS	30 TRDE	31 ACCR
1	HFRG	0.1	1.0	3.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	3.3	-	4.4	3.8	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.1	0.5	1.1
2	SBLC	0.2	26.5	10.7	1.0	0.4	0.1	0.0	0.0	0.0	0.0	168.2	-	4.7	2.1	0.2	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.1	3.6	0.2
3	DAIF	0.1	8.0	7.0	0.5	0.2	0.0	0.0	0.0	0.0	0.0	-	603.8	2.4	2.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.1	0.6	0.2
4	OTHF	0.3	5.1	4.1	1.8	0.5	0.0	0.0	0.0	0.0	0.0	38.1	2.6	3.3	1.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.1	0.3	0.2
5	SAHF	1.2	14.5	10.1	1.1	1.7	2.1	0.0	0.1	0.1	0.2	16.3	-	1.0	0.3	0.0	0.1	-	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.6	0.4	0.0
6	FOLO	0.0	0.3	0.6	0.0	0.0	1.8	0.0	0.1	0.0	0.2	0.9	-	0.0	0.1	0.0	8.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	1.1	0.4	0.0
7	FISH	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.1	0.1	0.1	0.0	-	25.7	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
8	COAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	FUEL	0.2	5.3	5.1	1.2	1.3	1.6	0.5	69.2	889.5	84.4	4.6	5.7	10.0	3.0	0.2	3.0	-	4.2	14.2	0.5	0.8	1.9	3.5	4.4	0.5	21.5	0.0	0.2	43.1	6.6	0.7
10	OMIN	0.1	1.8	2.5	0.2	0.0	0.0	0.0	26.1	32.4	60.9	-	-	-	-	-	-	-	-	0.2	0.2	3.0	4.7	1.3	0.1	0.1	-	0.0	0.1	13.5	0.2	-
11	MEAT	0.0	0.9	4.1	0.4	0.0	0.0	0.0	2.3	0.0	3.8	45.4	-	3.8	-	0.8	-	-	0.9	-	0.6	-	-	-	-	-	-	-	-	-	0.2	11.8
12	DAIR	-	-	-	-	-	-	-	-	0.3	-	-	8.4	0.5	0.3	-	0.5	-	0.0	0.1	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.0	2.0	1.1
13	OFOD	0.0	1.5	6.1	0.6	0.1	0.0	0.3	0.3	0.2	0.5	3.2	2.3	67.2	6.3	0.0	0.2	-	0.2	0.1	0.1	0.0	0.0	0.2	0.3	0.0	0.0	0.0	0.0	0.2	1.7	6.4
14	BEVT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.8	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	2.7
15	TCFL	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	-	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	1.0	0.4	0.0
16	WOOD	0.0	0.1	0.2	0.0	0.0	0.2	0.0	0.1	0.1	0.2	0.1	0.1	0.1	0.7	0.0	20.6	-	0.2	0.0	0.0	0.6	0.2	0.9	0.7	3.3	0.0	0.0	0.0	166.7	0.8	0.0
17	PAPR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	PPRM	0.0	0.3	0.1	0.1	0.1	0.0	0.0	0.2	1.5	0.3	1.5	1.1	3.8	2.4	0.0	0.7	-	3.2	0.2	0.3	0.2	0.2	1.4	1.5	0.2	0.3	0.0	0.0	4.6	6.1	0.6
19	CHEM	0.9	21.9	35.5	2.1	1.1	0.9	0.0	1.5	8.6	2.6	3.1	2.2	2.8	0.8	0.0	5.9	-	0.3	29.8	4.6	0.3	0.6	3.8	3.3	0.3	0.2	0.0	0.0	5.5	2.9	0.1
20	RBPL	0.2	1.4	2.5	0.3	0.1	0.1	0.0	0.3	0.8	0.5	4.7	3.5	6.5	0.6	0.0	0.7	-	0.5	0.3	1.0	0.0	0.1	1.2	1.6	0.1	0.0	0.0	0.0	11.4	1.7	0.2
21	NMMP	0.0	0.2	0.3	0.0	0.0	0.0	0.0	1.7	3.7	2.8	0.0	0.0	0.3	2.7	0.0	0.1	-	0.0	0.0	0.0	3.5	0.2	1.1	3.2	0.1	0.0	0.0	0.0	73.7	0.5	0.0
22	BASM	0.0	0.2	0.2	0.0	0.1	0.2	0.0	0.8	3.7	1.4	2.9	2.1	2.3	1.1	0.0	1.4	-	0.5	0.7	0.2	0.7	18.4	37.9	18.6	1.0	0.1	0.0	0.0	9.8	6.8	0.5
23	FABM	0.1	2.3	3.2	0.3	0.2	0.3	0.1	2.0	4.2	3.2	4.0	3.0	7.1	18.1	0.1	1.7	-	0.4	0.8	0.6	0.6	10.6	59.0	35.7	1.0	0.7	0.0	0.1	58.3	6.5	1.2
24	MAEQ	0.1	1.6	2.9	0.2	0.9	0.1	0.6	1.2	23.4	2.1	1.1	0.8	2.0	1.9	0.0	0.4	-	0.4	0.5	0.1	0.1	1.4	3.5	27.4	0.1	2.8	0.0	0.1	61.6	5.3	0.8
25	OMFG	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.0	0.2	0.5	0.0	0.1	-	0.1	0.0	0.0	0.0	0.1	0.5	0.7	0.4	0.0	0.0	0.0	6.5	0.4	0.3
26	ELEC	0.5	2.1	5.7	0.7	0.1	0.1	0.1	4.2	11.9	21.5	10.7	5.7	7.0	1.7	0.1	3.6	-	0.5	1.8	0.4	0.8	17.3	2.3	2.4	0.2	136.3	0.2	0.0	6.1	5.2	3.6
27	WATS	-	-	-	-	0.0	0.0	0.0	0.0	0.1	0.0	0.7	0.2	0.1	0.2	0.0	-	-	-	-	-	-	-	-	0.0	-	0.0	0.3	0.0	0.1	0.1	0.0
28	WAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.9	0.7	0.0	0.0	0.8	-	0.0	0.1	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	2.6	3.9	0.0	0.0
29	CONS	0.2	3.5	4.8	0.4	0.1	0.3	0.1	38.0	57.0	62.9	0.3	0.2	0.4	0.7	0.0	0.6	-	0.1	0.1	0.1	0.9	0.2	1.4	9.3	0.1	19.3	0.0	0.2	770.6	1.2	0.1
30	TRDE	0.7	14.6	22.6	1.8	1.4	1.1	0.4	8.0	13.0	13.3	13.6	10.0	32.1	12.5	0.5	3.9	-	1.8	2.4	0.4	0.6	7.3	8.7	16.2	0.6	1.5	-	0.3	98.3	26.0	9.2
31	ACCR	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.3	0.6	0.5	0.1	0.1	0.2	0.1	0.0	0.1	-	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.1	0.0	0.0	2.6	0.8	0.3
32	RDFR	0.4	4.6	2.4	0.9	0.4	4.9	0.1	7.0	4.1	11.6	17.5	18.0	22.0	5.2	0.1	5.5	-	1.3	6.0	0.7	1.5	5.9	3.8	4.3	0.4	0.1	0.0	0.1	9.4	13.4	0.1
33	RDPS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	0.1
34	RFRT	0.0	0.4	0.3	0.1	-	0.3	-	29.4	-	11.8	3.5	1.3	2.1	0.6	0.0	0.5	-	0.2	1.1	0.1	0.2	0.7	0.8	0.7	0.1	-	-	-	0.4	0.3	-
35	WFRT	-	-	-	-	-	0.0	0.0	1.1	6.5	7.9	1.7	-	0.4	0.2	-	0.2	-	-	0.1	-	0.2	0.2	0.1	0.1	-	-	0.0	0.0	0.1	-	0.1
36	OFRT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	-	0.4	0.0	0.4	0.0	0.0	0.1	-	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	-	-	0.1	0.4	-
37	OTTR	0.1	0.8	0.6	0.2	0.2	0.7	0.3	3.8	7.7	4.5	10.1	1.2	9.6	1.4	0.1	1.6	-	0.5	1.4	0.3	0.2	1.0	1.1	2.5	0.2	0.2	0.0	0.0	3.4	9.3	0.1
38	COMM	0.2	1.8	1.2	0.6	0.1	0.2	0.0	1.2	1.7	2.0	1.4	1.0	2.1	0.9	0.0	0.5	-	0.6	0.4	0.2	0.2	0.4	1.2	2.1	0.1	0.5	0.0	0.1	11.2	5.2	0.5
39	FIIN	0.7	5.6	3.4	1.1	0.7	0.7	0.4	2.0	6.9	3.3	3.0	2.2	6.1	6.7	0.1	1.7	-	0.9	0.9	0.4	0.3	4.5	2.5	3.2	0.2	2.4	0.0	0.1	14.2	14.3	1.7
40	HOUS	0.2	2.9	4.5	0.1	0.1	0.1	0.0	0.4	1.5	0.7	1.9	1.4	2.4	0.9	0.1	0.6	-	0.5	0.3	0.2	0.2	0.3	2.3	2.3	0.2	1.8	0.0	0.0	11.6	11.9	1.5
41	EHOP	0.1	0.8	0.7	0.1	0.1	0.2	0.1	2.2	1.0	3.6	0.7	0.5	1.7	0.3	0.0	0.4	-	0.2	0.3	0.1	0.1	0.2	0.4	0.8	0.0	0.6	0.0	0.1	2.6	1.2	0.2
42	SRCS	0.2	2.2	1.5	0.2	0.4	0.3	0.1	2.7	30.3	4.5	5.3	3.9	4.5	4.9	0.0	0.7	-	0.6	1.4	0.3	0.4	1.7	3.3	6.4	0.1	17.3	0.0	0.0	22.5	7.3	0.6
43	OBUS	0.7	8.5	5.7	2.2	0.6	1.5	0.3	4.1	13.4	6.7	10.0	7.4	20.2	15.7	0.2	4.0	-	2.8	1.9	1.3	1.1	1.8	6.7	10.0	0.6	5.3	0.0	0.2	59.4	31.8	4.6
44	GOVC	0.0	1.0	0.9	0.1	0.0	0.1	0.0	0.2	0.2	0.4	0.1	0.1	0.3	0.1	0.0	0.5	-	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.1	0.0	0.0	1.8	0.8	0.1
45	GOVL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.9	0.1	14.7	0.2	0.1	0.2	0.1	0.0	0.1	-	0.0	0.0	0.0	0.7	0.0	0.1	0.1	0.0	-	-	0.2	1.0	0.1	0.0
46	SCHL	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.1	0.0	0.1	0.1	0.0	0.2	-	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.2	0.0	0.0	0.5	0.2	0.0
47	OEDU	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.5	0.1	0.0
48	HOSP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
49	OHCS	0.0	1.2	3.4	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.3	0.0	0.1	-	0.1	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.1	0.0	0.0	0.6	0.3	0.0
50	CULT	0.1	1.1	0.8	0.2	0.1	0.0	0.0	0.1	0.5	0.2	1.6	1.2	3.4	1.9	0.0	0.3	-	0.8	0.2	0.3	0.2	0.1	0.5	1.1	0.1	0.3	0.0	0.0	2.1	4.3	0.6
51	PERS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Other Imports	1.7	32.6	20.3	3.7	1.8	1.9	1.8	3.2	-	13.9	30.3	27.4	112.3	35.4	1.8	8.0	-	14.7	20.0	11.2	3.9	13.8	51.0	70.0	4.3	2.0	0.0	0.1	729.2	31.5	7.0
	Compensation of Employees	8.9	15.6	149.7	7.1	24.3	2.1	1.5	-	78.1	18.7	85.5	77.0	11.5	1.9	1.8	24.7	-	13.6	41.6	4.9	5.6	15.1	80.2	77.8	6.6	22.9	0.4	2.3	180.7	257.7	48.6
	Depreciation + Op Surplus	1.9	42.5	-4.9	3.0	-7.3	9.6	1.5	145.8	632.4	244.3	46.6	122.0	169.9	70.0	1.4	23.0	-	19.2	-10.7	6.8	11.8	74.1	27.9	72.4	3.3	79.1	1.7	5.1	808.3	-41.4	14.5
	Net Indirect Taxes	0.3	33.2	-1.0	1.2	-0.4	0.4	-0.0	20.9	412.6	17.4	2.5	4.1	6.3	161.4	0.0	0.9	-	0.9	-0.3	0.4	0.9	1.0	1.5	1.5	0.1	1.5	0.0	0.2	71.5	-2.9	2.0
	Domestic Import	2.8	50.9	43.1	5.4	3.1	9.6	1.8	14.8	47.4	37.0	207.4	26.0	121.4	47.5	1.0	37.3	-	10.5	4.7	4.0	5.6	18.0	14.3	23.6	1.7	19.3	1.1	2.0	185.5	60.4	21.7
	Gross Output	**23.2**	**319.8**	**364.4**	**39.0**	**33.0**	**42.0**	**10.8**	**404.7**	**2,296.3**	**665.0**	**753.6**	**947.9**	**686.0**	**420.3**	**9.0**	**163.2**	**-**	**81.3**	**120.9**	**40.6**	**45.3**	**202.4**	**325.2**	**406.0**	**26.4**	**336.8**	**3.9**	**14.2**	**3,457.0**	**487.8**	**145.5**

Table B.7: 2009 I-O table of Taranaki (Million NZD) – Continuation (right hand side)

32 RDFR	33 RDPS	34 RFRT	35 WFRT	36 OFRT	37 OTTR	38 COMM	39 FIIN	40 HOUS	41 EHOP	42 SRCS	43 OBUS	44 GOVC	45 GOVL	46 SCHL	47 OEDU	48 HOSP	49 OHCS	50 CULT	51 PERS	Private Consumption	Government Consumption	Stock Change	Gross Investment	Exports	Import Adjustments	Final Demand	Gross Output
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	11.1	0.2	-0.0	0.1	10.2	-0.0	-16.4	**23.2**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	1.7	0.0	0.1	0.2	14.5	-0.0	85.0	**319.8**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.4	0.1	0.0	0.2	1.9	-	-263.9	**364.4**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	4.1	0.2	0.0	0.2	5.5	-0.0	-29.1	**39.0**
0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.2	0.0	1.8	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.6	0.3	0.0	3.0	0.9	-0.0	-24.9	**33.0**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.1	3.6	0.5	9.4	-0.0	12.1	**42.0**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	1.6	-0.0	-18.1	**10.8**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.0	-	14.1	65.3	-	325.0	**404.7**
4.2	0.8	0.6	1.1	0.5	7.7	0.2	0.2	0.5	0.2	0.8	0.7	1.5	2.4	0.2	0.5	0.9	1.4	0.1	0.3	41.3	1.0	-6.6	257.3	574.0	-1,192.7	1,410.7	**2,296.3**
0.1	0.0	0.3	-	-	0.0	0.0	0.0	0.1	0.0	0.0	0.0	-	-	-	-	-	-	-	-	0.1	0.1	0.0	11.7	145.0	-6.4	366.4	**665.0**
-	-	-	-	0.0	0.0	-	-	-	-	-	-	0.1	-	0.0	0.1	0.2	0.0	0.1	0.0	58.1	1.4	-	0.6	418.4	-0.0	199.3	**753.6**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	31.3	0.5	-14.6	0.8	823.1	-	92.8	**947.9**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.8	0.1	0.1	0.0	65.3	0.4	-0.5	1.9	245.5	-0.0	274.4	**686.0**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	72.9	1.4	1.4	0.2	109.9	-0.0	229.6	**420.3**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.0	0.2	0.1	0.0	3.9	-0.0	-8.7	**9.0**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	1.2	0.1	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.4	0.9	0.2	1.1	1.3	54.3	-0.0	-93.0	**163.2**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.1	0.2	-	-	-	-	-8.3	
0.1	0.1	0.1	0.0	0.0	0.6	0.8	1.6	0.7	0.3	1.1	6.2	0.5	0.2	0.3	0.5	0.3	0.8	0.3	1.0	12.6	0.2	0.3	0.5	6.1	-0.0	15.2	**81.3**
0.4	0.1	0.1	0.0	0.0	0.7	0.0	0.0	0.1	0.1	0.1	0.3	0.1	0.2	0.1	0.1	0.7	0.7	0.0	0.3	2.5	0.0	0.1	0.1	16.0	-0.1	-43.6	**120.9**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.1	0.5	0.1	0.1	0.0	0.1	0.4	0.4	0.0	0.2	14.3	3.1	0.0	0.8	8.3	-0.0	-28.9	**40.6**
0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.5	3.1	-0.1	-55.5	**45.3**
0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.3	0.1	0.0	1.0	0.4	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.7	0.0	0.1	1.7	67.3	-0.1	18.6	**202.4**
0.0	0.0	0.1	0.0	0.0	0.6	0.1	0.3	3.8	0.2	0.6	0.3	0.4	0.5	0.1	0.2	0.2	0.0	0.0	0.0	3.2	0.1	2.6	13.1	33.0	-0.2	40.6	**325.2**
0.4	0.3	0.8	0.3	0.3	4.7	2.4	0.2	0.7	0.9	1.0	1.5	1.4	3.1	0.5	1.7	1.7	0.3	0.4	0.4	21.4	0.1	3.0	86.9	129.4	-2.2	0.7	**406.0**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	12.4	0.2	0.7	6.8	5.7	-0.0	-11.3	**26.4**
0.1	0.1	0.4	0.0	0.0	0.8	0.7	0.6	0.1	0.2	0.9	1.3	0.8	3.9	0.6	2.1	0.9	1.3	0.4	0.4	61.9	1.2	0.0	8.6	0.8	-	-4.0	**336.8**
0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	1.2	-	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	-	0.1	0.0	-0.0	0.3	**3.9**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.1	0.3	2.7	0.1	0.1	0.3	0.7	0.0	0.7	0.3	0.0	0.0	0.0	0.0	-	-1.8	**14.2**
0.2	0.1	0.2	0.1	0.1	0.9	1.4	1.2	41.6	0.2	0.6	0.5	4.9	38.4	0.6	3.8	1.1	3.2	0.9	1.6	5.2	0.2	0.7	1,949.6	22.0	-0.0	405.0	**3,457.0**
5.1	1.5	0.5	0.2	0.2	3.2	1.7	2.3	7.3	1.8	1.5	6.4	1.9	1.7	1.0	1.4	4.0	2.6	0.3	0.1	470.9	17.0	5.9	45.7	99.4	-0.0	-519.1	**487.8**
0.1	0.0	0.1	0.0	0.0	0.8	0.0	0.2	0.1	0.1	0.3	0.4	1.5	0.4	0.6	1.0	0.6	1.9	0.2	0.3	108.6	2.0	0.1	0.2	41.4	-0.0	-22.5	**145.5**
21.3	0.1	0.4	0.1	0.1	2.0	0.7	0.3	0.1	0.5	0.3	1.4	0.3	0.7	0.1	0.2	0.1	0.3	0.2	0.6	4.5	0.9	0.0	0.3	1.3	-	-96.7	**91.9**
0.2	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.3	0.3	0.1	0.0	0.3	0.3	0.1	0.4	0.1	0.2	8.9	5.3	0.0	0.1	2.1	-	-5.7	**14.6**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.3	0.2	-	0.3	-	-	-36.6	**23.2**
0.8	0.1	1.3	-	0.0	0.1	0.1	0.0	-	-	-	-	-	-	-	-	-	-	-	-	2.0	0.2	-	0.3	-	-	-16.5	**7.6**
0.1	-	0.0	0.0	0.1	0.9	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1	0.2	0.0	0.1	3.0	-0.0	-1.4	**8.5**
1.9	0.1	1.5	0.4	1.4	22.0	1.0	1.1	0.2	0.8	2.0	4.0	1.4	0.6	0.1	0.6	0.2	0.4	0.4	0.5	24.8	0.6	0.1	1.5	47.4	-0.2	-38.8	**138.8**
2.0	0.2	0.2	0.1	0.1	0.9	11.3	2.6	0.4	0.4	2.0	3.6	1.3	1.7	0.2	1.1	0.6	1.2	0.5	0.9	59.3	1.6	-0.0	2.7	8.0	-0.0	-22.4	**117.9**
1.2	0.4	0.8	0.3	0.3	4.4	1.1	50.2	14.1	2.7	3.1	8.1	2.7	2.5	0.3	1.5	1.5	3.9	1.2	3.1	86.5	2.2	0.0	3.5	7.8	-0.0	35.4	**329.0**
0.7	0.1	0.2	0.1	0.1	1.3	0.7	3.2	27.4	0.8	1.8	4.3	2.7	0.6	0.1	0.7	0.4	3.5	1.0	1.1	493.0	13.8	0.0	25.6	5.7	-0.0	-60.7	**579.2**
0.6	0.2	1.0	0.3	0.3	5.3	0.2	0.6	0.4	2.2	0.8	1.2	0.6	2.0	0.0	0.4	0.4	0.6	0.2	0.4	3.9	1.1	0.0	1.0	8.5	-0.0	7.7	**59.3**
0.1	0.1	0.2	0.1	0.1	1.3	1.4	9.0	0.3	0.7	15.9	6.6	3.1	7.4	0.1	0.4	1.4	2.2	1.0	1.2	4.2	13.3	0.1	22.3	6.3	-0.1	-63.8	**158.4**
1.5	0.6	0.8	0.2	0.3	4.4	5.1	14.0	4.9	3.3	8.9	28.9	6.8	7.2	1.2	4.3	3.9	8.5	3.1	7.5	14.0	6.0	0.0	4.8	10.9	-0.1	-71.8	**308.1**
0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.6	0.4	0.1	0.2	0.4	0.4	0.1	0.2	0.1	0.3	0.6	0.1	0.2	6.5	273.6	-0.0	0.6	1.1	-	-178.3	**114.9**
0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.1	0.2	1.1	0.1	3.9	0.8	0.1	0.2	0.3	1.4	0.3	5.0	112.4	-	0.7	3.3	-	52.8	**209.8**
0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.3	0.2	0.2	0.2	0.5	0.2	0.2	0.1	0.3	4.0	98.1	0.0	0.1	2.5	-	-22.8	**87.6**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.5	0.2	0.0	0.1	0.6	0.1	0.3	0.0	0.4	32.5	52.9	0.0	0.8	18.5	-0.0	-14.2	**94.1**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	15.9	157.6	0.0	0.3	0.5	-	-9.6	**165.5**
0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.3	0.1	0.1	0.3	0.4	0.8	0.8	0.2	0.2	4.3	18.6	0.3	0.1	72.4	106.0	0.0	0.6	1.6	-0.0	-10.5	**203.9**
0.1	0.0	0.1	0.0	0.0	0.6	1.4	0.8	0.3	0.4	0.5	10.0	0.4	2.9	0.7	0.4	0.1	0.4	4.8	0.8	111.7	9.3	0.0	0.3	4.8	-0.0	-120.8	**52.3**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	75.3	2.8	0.0	0.3	2.3	-0.0	8.2	**88.8**
2.1	1.3	1.8	0.7	0.7	10.9	5.7	3.2	9.1	4.9	6.6	17.8	4.7	3.8	2.6	4.2	13.9	11.0	4.6	6.1	405.7	16.5	15.9	351.9	-	1,202.3	-	**3,362.8**
39.2	7.1	5.5	1.3	1.6	49.8	14.3	43.8	16.9	5.0	65.2	113.6	63.7	53.7	83.7	27.6	87.4	82.9	31.2	36.4	-	-	-	-	-	-	-	**2,096.0**
1.1	-1.1	3.0	1.4	1.1	-2.7	50.8	102.5	350.0	23.7	20.8	39.1	0.3	43.5	-9.6	28.2	27.7	39.6	-5.5	6.8	-	-	-	-	-	-	-	**3,294.7**
0.8	0.6	-1.0	-	0.1	-0.3	1.1	26.4	65.9	1.8	0.6	0.6	0.1	1.5	-0.6	3.6	0.6	0.4	-1.0	0.5	246.9	35.4	0.1	42.1	41.9	-	-	**1,206.3**
6.8	1.5	4.0	0.8	1.0	16.9	14.9	62.3	29.0	7.1	18.5	44.1	10.9	22.4	2.6	7.2	9.5	14.7	5.5	15.3	-	-	-	-	-	-	-1,660.2	**-336.2**
91.9	**14.6**	**23.2**	**7.6**	**8.5**	**138.8**	**117.9**	**329.0**	**579.2**	**59.3**	**158.4**	**308.1**	**114.9**	**209.8**	**87.6**	**94.1**	**165.5**	**203.9**	**52.3**	**88.8**	**2,708.1**	**940.9**	**14.5**	**2,866.7**	**3,093.3**	**-**	**-**	**25,348.8**

B.8. Manawatu-Wanganui Regional Table

Table B.8: 2009 I-O table of Manawatu-Wanganui (Million NZD)

Industries		1 HFRG	2 SBLC	3 DAIF	4 OTHF	5 SAHF	6 FOLO	7 FISH	8 COAL	9 FUEL	10 OMIN	11 MEAT	12 DAIR	13 OFOD	14 BEVT	15 TCFL	16 WOOD	17 PAPR	18 PPRM	19 CHEM	20 RBPL	21 NMMP	22 BASM	23 FABM	24 MAEQ	25 OMFG	26 ELEC	27 WATS	28 WAST	29 CONS	30 TRDE	31 ACCR
1	HFRG	1.0	4.7	14.1	0.5	0.9	0.8	0.0	0.0	0.0	0.0	5.0	-	6.5	5.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.1	4.4	5.3
2	SBLC	1.8	89.5	36.1	5.3	2.2	1.1	0.0	0.0	0.0	0.0	179.6	-	5.0	2.2	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.1	25.1	0.8
3	DAIF	0.8	14.2	12.4	1.3	0.8	0.2	0.0	0.0	0.0	0.0	-	337.0	1.4	1.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	2.3	0.4
4	OTHF	1.5	9.1	7.3	5.1	1.5	0.2	0.0	0.0	0.0	0.0	21.3	1.5	1.9	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	1.3	0.4
5	SAHF	7.9	32.8	22.7	3.9	7.1	11.5	0.0	0.0	0.0	0.0	11.6	-	0.7	0.2	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.4	2.0	0.0
6	FOLO	0.3	2.0	3.6	0.3	0.1	25.7	0.0	0.0	0.0	0.0	1.6	-	0.1	0.2	0.1	23.9	5.1	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	1.7	5.0	0.0
7	FISH	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	COAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	FUEL	0.5	5.7	5.5	2.0	2.5	4.1	0.1	1.6	45.0	1.9	1.6	1.9	3.4	1.0	1.3	1.6	2.1	3.1	7.4	0.9	0.7	0.3	0.9	1.9	0.6	17.8	0.0	0.4	12.2	14.8	0.8
10	OMIN	0.1	1.2	1.6	0.2	0.0	0.0	0.0	0.4	1.0	0.8	-	-	-	-	-	-	-	-	0.1	0.2	1.7	0.5	0.2	0.0	0.1	-	0.0	0.1	2.3	0.3	-
11	MEAT	0.2	1.6	7.3	1.2	0.1	0.1	0.0	0.1	0.0	0.1	25.4	-	2.1	-	10.8	-	-	1.2	-	1.8	-	-	-	-	-	-	-	-	-	0.7	21.2
12	DAIR	-	-	-	-	-	-	-	-	0.0	-	-	4.7	0.3	0.2	-	0.4	0.2	0.0	0.0	0.1	0.1	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.0	7.4	2.0
13	OFOD	0.3	2.9	11.9	1.8	0.2	0.1	0.2	0.0	0.0	0.0	2.0	1.4	41.6	3.9	0.1	0.2	0.2	0.2	0.1	0.3	0.0	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.1	6.8	12.7
14	BEVT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	3.3
15	TCFL	0.1	0.1	0.6	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.2	6.7	0.3	0.1	0.4	0.0	0.1	0.0	0.0	0.1	0.3	0.2	0.0	0.0	0.0	2.4	8.3	0.0
16	WOOD	0.0	0.2	0.3	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.1	17.6	2.2	0.2	0.0	0.1	0.8	0.1	0.4	0.4	6.7	0.0	0.0	0.0	73.6	2.8	0.0
17	PAPR	1.8	0.3	0.3	0.4	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.2	0.5	1.1	0.1	0.9	18.3	4.5	0.1	1.3	0.3	0.0	0.0	0.3	0.2	0.7	0.0	0.0	2.0	7.6	0.2
18	PPRM	0.1	0.6	0.2	0.2	0.4	0.2	0.0	0.0	0.1	0.0	0.8	0.6	2.1	1.3	0.5	0.6	1.6	4.0	0.2	0.9	0.3	0.1	0.6	1.0	0.3	0.4	0.0	0.1	2.2	22.5	1.0
19	CHEM	4.8	38.7	62.6	5.8	3.7	3.8	0.0	0.1	0.7	0.1	1.7	1.2	1.6	0.4	0.4	5.3	4.5	0.4	25.7	14.9	0.4	0.2	1.6	2.3	0.6	0.3	0.1	0.0	2.6	10.7	0.2
20	RBPL	1.3	4.0	7.1	1.2	0.3	0.7	0.0	0.0	0.1	0.0	4.2	3.1	5.9	0.6	0.4	1.0	0.5	1.1	0.5	5.4	0.1	0.1	0.8	1.8	0.5	0.0	0.0	0.1	8.6	10.4	0.7
21	NMMP	0.1	0.5	0.8	0.1	0.0	0.1	0.0	0.1	0.4	0.1	0.0	0.0	0.2	1.9	0.0	0.1	0.0	0.1	0.0	0.1	7.3	0.1	0.6	2.9	0.2	0.0	0.1	0.1	44.7	2.4	0.1
22	BASM	0.0	0.1	0.1	0.0	0.1	0.3	0.0	0.0	0.1	0.0	0.5	0.3	0.4	0.2	0.1	0.3	0.5	0.2	0.2	0.2	0.3	1.6	4.4	3.6	0.6	0.0	0.1	0.0	1.3	6.9	0.3
23	FABM	0.6	3.7	5.0	0.7	0.4	1.2	0.0	0.1	0.3	0.1	2.0	1.5	3.6	9.1	0.8	1.4	1.7	0.4	0.6	1.6	0.9	2.9	22.2	22.5	1.9	0.8	0.1	0.2	24.4	21.3	1.9
24	MAEQ	0.3	2.1	3.7	0.4	2.0	0.4	0.2	0.0	1.4	0.1	0.4	0.3	0.8	0.8	0.4	0.3	0.4	0.4	0.3	0.3	0.1	0.3	1.1	14.0	0.2	2.8	0.0	0.1	20.9	14.1	1.0
25	OMFG	0.0	0.2	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.3	0.7	1.3	0.0	0.1	0.0	4.3	2.1	0.7
26	ELEC	2.5	3.2	8.9	1.7	0.2	0.4	0.0	0.1	0.9	0.7	5.2	2.8	3.4	0.8	0.8	2.8	9.5	0.6	1.3	1.1	1.2	4.7	0.8	1.5	0.4	163.8	1.2	0.1	2.5	16.9	5.6
27	WATS	-	-	-	-	0.2	0.0	0.0	0.0	0.0	0.0	1.2	0.4	0.1	0.4	0.0	-	0.0	-	-	-	-	-	-	0.0	-	0.1	6.1	0.0	0.1	1.3	0.1
28	WAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.8	0.6	0.0	0.1	1.1	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.4	0.0	0.1	0.1	10.7	2.8	0.2	0.0
29	CONS	0.9	6.1	8.5	1.2	0.3	1.4	0.0	1.4	4.8	2.4	0.1	0.1	0.2	0.4	0.3	0.5	0.9	0.1	0.1	0.2	1.4	0.1	0.6	6.5	0.2	26.4	0.0	0.6	359.4	4.3	0.1
30	TRDE	4.3	27.9	43.1	5.5	4.9	5.1	0.2	0.3	1.2	0.5	8.2	6.1	19.3	7.5	6.9	3.8	5.4	2.5	2.2	1.5	1.0	2.4	4.0	12.3	1.5	2.3	-	0.8	49.5	103.1	17.9
31	ACCR	0.1	0.3	0.4	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.1	0.2	0.0	0.1	0.0	0.0	1.2	2.9	0.5
32	RDFR	2.2	8.2	4.3	2.5	1.4	21.2	0.1	0.3	0.3	0.4	9.8	10.1	12.3	2.9	1.7	4.9	2.8	1.6	5.2	2.3	2.4	1.8	1.6	3.0	0.9	0.1	0.0	0.3	4.4	49.1	0.1
33	RDPS	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.1
34	RFRT	0.1	0.7	0.5	0.2	-	1.4	-	1.1	-	0.4	2.0	0.7	1.2	0.4	0.4	0.5	1.3	0.3	1.0	0.4	0.3	0.2	0.3	0.5	0.2	-	-	-	0.2	1.1	-
35	WFRT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	OFRT	0.0	0.1	0.1	0.0	0.1	0.2	0.0	0.0	0.0	-	0.5	0.1	0.5	0.1	0.1	0.1	0.3	0.1	0.1	0.1	0.0	0.0	0.0	0.2	0.0	0.0	-	-	0.1	3.1	-
37	OTTR	0.1	0.3	0.2	0.1	0.2	0.7	0.0	0.0	0.2	0.0	1.4	0.2	1.3	0.2	0.2	0.3	0.8	0.1	0.3	0.2	0.1	0.1	0.1	0.4	0.1	0.1	0.0	0.0	0.4	8.2	0.0
38	COMM	0.9	3.4	2.3	1.7	0.5	0.8	0.0	0.0	0.2	0.1	0.9	0.6	1.3	0.5	0.4	0.5	0.5	0.8	0.4	0.7	0.3	0.1	0.5	1.6	0.2	0.8	0.0	0.2	5.7	20.7	1.0
39	FIIN	3.4	9.6	5.8	2.8	2.3	2.9	0.2	0.1	0.6	0.1	1.6	1.2	3.3	3.6	0.9	1.5	1.0	1.1	0.7	1.1	0.5	1.3	1.0	2.1	0.5	3.2	0.1	0.2	6.4	50.7	3.0
40	HOUS	1.0	4.6	7.2	0.2	0.4	0.4	0.0	0.0	0.1	0.0	0.9	0.7	1.2	0.5	0.7	0.5	0.2	0.6	0.2	0.6	0.2	0.1	0.9	1.4	0.4	2.2	0.0	0.1	4.9	39.7	2.4
41	EHOP	0.5	1.3	1.1	0.3	0.4	0.7	0.1	0.1	0.1	0.1	0.4	0.3	0.9	0.1	0.1	0.3	0.1	0.3	0.3	0.2	0.1	0.0	0.2	0.5	0.1	0.7	0.1	0.1	1.1	4.0	0.3
42	SRCS	0.9	3.4	2.4	0.5	1.2	1.3	0.1	0.1	2.3	0.2	2.7	2.0	2.2	2.5	0.4	0.5	2.7	0.7	1.1	1.0	0.6	0.5	1.2	4.1	0.3	21.3	0.1	0.1	9.5	24.3	1.0
43	OBUS	2.9	12.3	8.2	5.1	1.7	5.3	0.1	0.1	0.9	0.2	4.6	3.4	9.2	7.1	2.4	2.9	1.6	2.8	1.3	3.5	1.4	0.5	2.3	5.7	1.1	5.9	0.2	0.4	22.6	95.6	6.8
44	GOVC	0.5	4.1	3.4	0.6	0.2	0.7	0.0	0.0	0.0	0.0	0.2	0.1	0.3	0.1	0.1	1.0	0.2	0.1	0.1	0.1	0.2	0.0	0.2	0.3	0.2	0.2	0.0	0.1	1.9	6.5	0.5
45	GOVL	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.3	0.0	0.6	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.1	0.0	-	-	0.5	0.4	0.5	0.0
46	SCHL	0.0	0.2	0.3	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.3	0.0	0.0	0.2	0.8	0.1
47	OEDU	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.5	0.7	0.0
48	HOSP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
49	OHCS	0.1	2.2	5.9	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.2	0.0	0.1	0.2	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.3	1.1	0.0
50	CULT	0.4	1.9	1.3	0.5	0.4	0.1	0.0	0.0	0.0	0.0	0.9	0.7	1.8	1.0	0.3	0.3	0.2	1.0	0.1	0.9	0.3	0.0	0.2	0.8	0.1	0.4	0.0	0.0	1.0	15.2	1.0
51	PERS	0.1	0.3	0.9	0.1	0.5	0.7	0.0	0.0	0.0	0.0	3.5	2.6	0.7	0.6	0.6	0.1	0.0	0.7	0.1	0.2	0.0	0.0	0.2	0.4	0.0	1.3	0.0	0.0	2.1	4.6	0.2
	Other Imports	9.3	57.6	35.8	10.4	5.9	8.2	0.9	0.1	-	0.5	16.9	15.3	62.7	19.7	23.7	7.2	14.3	18.3	17.2	36.3	6.3	4.2	21.4	49.2	9.3	2.8	0.2	0.3	340.1	115.8	12.7
	Compensation of Employees	46.3	188.1	120.2	20.8	66.5	15.3	0.1	-	5.8	2.7	96.8	52.0	39.8	2.8	44.0	32.0	18.6	28.6	12.0	19.2	13.4	3.6	48.7	77.6	20.2	17.8	3.0	8.8	294.1	547.9	82.7
	Depreciation + Op Surplus	10.9	-15.0	111.7	7.6	-11.8	35.4	1.4	5.5	53.2	7.3	-20.6	59.4	62.7	38.6	-2.4	11.5	29.7	12.6	13.8	18.9	14.8	23.6	-2.5	28.3	1.3	121.6	11.0	10.5	184.3	221.2	30.3
	Net Indirect Taxes	1.6	-11.7	22.1	3.0	-0.6	1.5	-0.0	0.8	34.7	0.5	-1.1	2.0	2.3	88.9	-0.1	0.5	1.1	0.6	0.4	1.2	1.1	0.3	-0.1	0.6	0.0	2.3	0.1	0.5	16.3	15.5	4.2
	Domestic Import	10.6	41.1	45.3	13.0	9.4	25.3	1.4	2.4	37.0	4.6	25.7	13.7	76.0	23.4	6.5	19.7	17.1	10.6	10.4	12.7	12.3	12.0	21.3	34.5	5.6	63.6	3.4	1.9	96.4	258.9	38.0
	Gross Output	**123.3**	**564.7**	**643.5**	**108.4**	**107.2**	**181.0**	**5.4**	**15.2**	**191.5**	**24.9**	**420.6**	**529.1**	**382.9**	**234.6**	**116.6**	**147.7**	**146.2**	**100.9**	**104.1**	**131.4**	**72.5**	**61.8**	**136.8**	**285.0**	**56.5**	**460.9**	**26.1**	**37.1**	**1,612.6**	**1,794.3**	**261.9**

Table B.8: 2009 I-O table of Manawatu-Wanganui (Million NZD) – Continuation (right hand side)

32 RDFR	33 RDPS	34 RFRT	35 WFRT	36 OFRT	37 OTTR	38 COMM	39 FIIN	40 HOUS	41 EHOP	42 SRCS	43 OBUS	44 GOVC	45 GOVL	46 SCHL	47 OEDU	48 HOSP	49 OHCS	50 CULT	51 PERS	Private Consumption	Government Consumption	Stock Change	Gross Investment	Exports	Import Adjustments	Final Demand	Gross Output
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.1	0.2	0.0	0.0	0.0	1.7	0.1	0.0	0.0	20.2	0.4	-0.2	0.4	54.2	-0.0	-3.7	**123.3**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.2	0.2	0.1	0.0	0.2	0.0	0.0	0.0	0.2	0.1	0.4	0.0	3.1	0.1	0.1	0.4	25.6	-0.0	179.3	**564.7**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.4	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.1	0.0	0.8	0.3	0.0	0.4	3.3	-	265.4	**643.5**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.3	0.0	0.0	0.0	0.2	0.1	0.2	0.0	7.4	0.4	0.1	0.4	15.3	-0.0	31.6	**108.4**
0.1	0.0	0.1	-	0.1	0.2	0.0	0.1	0.0	0.4	0.0	3.7	2.0	0.1	0.0	0.1	0.0	0.6	0.5	0.1	1.1	0.7	0.0	9.6	2.9	-0.0	-17.1	**107.2**
0.2	0.0	0.0	-	0.0	0.1	0.0	0.0	0.1	0.0	0.0	4.6	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	2.7	0.2	15.5	1.9	40.7	-0.0	44.5	**181.0**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.8	-0.0	3.6	**5.4**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6	0.0	-	0.5	2.4	-	11.6	**15.2**
3.3	0.6	0.8	-	1.3	5.9	0.3	0.2	0.5	0.2	0.8	0.7	7.3	2.3	0.3	1.0	1.3	2.0	0.2	0.4	75.1	2.2	-0.6	21.5	47.9	-99.5	-28.2	**191.5**
0.1	0.0	0.2	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-	-	-	-	0.2	0.1	0.0	0.4	5.4	-0.2	7.8	**24.9**
-	-	-	-	0.0	0.0	-	-	-	-	-	-	0.9	-	0.1	0.4	0.4	0.0	0.2	0.0	105.7	3.0	-	0.4	233.5	-0.0	2.2	**420.6**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	-	0.0	0.0	0.1	0.1	0.0	-	0.0	57.0	1.2	-8.1	0.5	459.4	-	3.1	**529.1**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.2	0.0	0.0	0.1	2.1	0.2	0.3	0.0	118.8	0.9	-0.3	1.1	137.0	-0.0	34.7	**382.9**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	132.6	2.9	0.8	0.1	61.3	-0.0	32.3	**234.6**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	2.1	0.0	0.0	0.2	1.0	0.1	0.1	0.3	0.1	0.1	0.2	0.0	19.9	0.4	1.5	0.5	50.8	-0.0	18.5	**116.6**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	1.0	0.0	1.9	0.2	0.2	0.0	0.2	0.3	0.1	0.0	0.0	0.9	1.7	0.4	1.0	1.2	49.1	-0.0	-17.5	**147.7**
0.1	0.0	0.1	-	0.1	0.3	0.0	0.1	3.4	0.0	0.6	5.4	0.1	0.1	0.1	0.2	0.1	0.6	0.0	0.0	14.7	0.4	0.1	0.1	57.5	-0.0	20.2	**146.2**
0.2	0.1	0.2	-	0.2	0.7	1.6	2.4	1.2	0.5	1.7	10.0	3.9	0.3	1.0	1.7	0.7	1.9	1.1	2.7	22.9	0.5	0.4	0.6	7.6	-0.0	-6.1	**100.9**
0.5	0.1	0.3	-	0.2	0.8	0.0	0.1	0.2	0.2	0.1	0.5	0.7	0.3	0.2	0.4	1.7	1.6	0.1	0.8	4.5	0.1	0.1	0.1	13.8	-0.1	-118.6	**104.1**
0.0	0.0	0.0	-	0.0	0.1	0.1	0.1	1.0	0.1	0.3	1.4	0.8	0.2	0.2	0.4	1.7	1.7	0.1	1.0	26.0	6.6	0.1	2.7	26.8	-0.1	-0.1	**131.4**
0.2	0.1	0.0	-	0.0	0.0	0.1	0.0	0.7	0.5	1.2	0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.1	2.3	0.1	0.0	0.8	5.0	-0.1	-2.0	**72.5**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.1	0.0	0.0	0.5	0.2	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.0	1.3	0.0	0.0	0.5	20.6	-0.0	15.7	**61.8**
0.1	0.0	0.2	-	0.1	0.6	0.2	0.5	5.8	0.4	0.9	0.4	2.6	0.7	0.3	0.7	0.3	0.1	0.1	0.1	5.8	0.3	1.1	5.5	13.9	-0.1	-37.7	**136.8**
0.4	0.3	1.4	-	0.9	4.4	3.5	0.2	0.9	1.2	1.1	1.8	8.7	3.7	1.2	4.1	3.0	0.5	1.0	0.8	39.0	0.2	2.1	61.0	90.8	-1.5	-15.6	**285.0**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	2.5	0.1	0.0	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.3	22.5	0.5	1.5	14.6	12.3	-0.0	-10.1	**56.5**
0.1	0.1	0.8	-	0.2	0.9	1.2	0.8	0.2	0.3	1.3	1.8	5.7	5.5	1.8	6.0	1.9	2.7	1.1	0.9	112.5	2.6	0.0	11.8	1.2	-	54.1	**460.9**
0.0	0.0	0.0	-	0.0	0.0	-	0.0	7.1	-	0.0	0.0	0.1	2.1	0.0	0.0	0.1	0.1	0.0	-	0.1	0.0	-	0.7	0.0	-0.0	5.7	**26.1**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.6	0.1	0.0	0.0	0.3	4.0	6.9	0.4	0.3	1.2	2.4	0.0	3.0	0.5	0.1	0.0	0.1	0.0	-	-0.7	**37.1**
0.3	0.2	0.4	-	0.3	1.2	2.8	1.8	71.2	0.4	1.0	0.8	40.3	61.8	1.9	12.3	2.6	7.7	3.1	4.2	9.4	0.4	0.3	909.4	10.3	-0.0	39.1	**1,612.6**
6.9	2.0	1.3	-	0.9	4.3	3.6	3.8	13.4	3.5	2.7	11.2	17.2	3.0	3.4	4.7	10.4	6.6	1.3	0.3	856.9	36.3	21.9	168.2	365.6	-0.1	-106.2	**1,794.3**
0.1	0.0	0.3	-	0.2	0.9	0.1	0.3	0.1	0.1	0.4	0.7	11.5	0.6	1.8	3.0	1.5	4.3	0.5	0.9	197.7	4.3	0.2	0.3	74.5	-0.0	-49.3	**261.9**
27.0	0.1	0.8	-	0.6	2.6	1.3	0.4	0.1	0.8	0.5	2.2	2.7	1.1	0.2	0.5	0.2	0.7	0.6	1.6	8.1	2.0	0.0	0.4	1.7	-	-98.4	**116.4**
0.2	0.2	0.1	-	0.0	0.2	0.0	0.2	0.0	0.1	0.5	0.6	1.0	0.0	0.9	1.1	0.3	1.0	0.3	0.7	16.1	11.3	0.0	0.1	2.7	-	-20.4	**18.5**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.8	0.5	-	0.7	-	-	26.8	**51.1**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.6	0.4	-	-	-	-	-4.0	-
0.2	-	0.2	-	0.6	2.5	0.2	0.2	0.0	0.1	0.3	0.6	1.0	0.1	0.0	0.2	0.0	0.1	0.1	0.1	5.6	0.5	0.0	0.4	13.2	-0.0	6.2	**38.1**
0.6	0.0	0.8	-	1.5	6.7	0.5	0.4	0.1	0.3	0.8	1.6	2.7	0.2	0.1	0.5	0.1	0.3	0.3	0.3	45.1	1.3	0.1	1.9	60.0	-0.2	33.4	**175.7**
2.8	0.2	0.4	-	0.3	1.3	24.1	4.2	0.8	0.7	3.5	6.4	11.7	2.9	0.6	3.8	1.5	3.3	2.1	2.5	107.8	3.5	-0.0	5.3	15.6	-0.0	-22.8	**230.4**
1.5	0.5	1.7	-	1.2	5.4	2.1	73.1	23.2	4.5	4.8	12.7	21.7	3.8	0.8	4.7	3.4	9.1	4.0	7.9	157.4	4.7	0.0	5.2	11.8	-0.0	18.9	**497.1**
0.8	0.1	0.5	-	0.3	1.5	1.3	4.4	42.6	1.2	2.6	6.4	20.4	0.8	0.4	2.1	0.8	7.5	3.3	2.7	897.0	29.5	0.0	43.8	9.8	-0.0	-161.6	**990.9**
0.7	0.3	1.9	-	1.3	6.1	0.3	0.8	0.7	3.4	1.2	1.8	4.2	2.9	0.1	1.1	0.8	1.4	0.6	1.0	7.2	2.4	0.1	1.7	14.9	-0.0	32.7	**104.2**
0.1	0.1	0.5	-	0.3	1.5	2.5	12.2	0.4	1.0	23.3	9.7	22.7	10.7	0.4	1.1	3.1	4.8	3.1	2.7	7.7	28.3	0.1	36.3	10.2	-0.1	-16.0	**257.6**
1.5	0.6	1.4	-	1.0	4.5	8.2	17.3	6.8	4.8	11.8	38.3	45.5	9.5	3.3	11.3	7.7	16.6	9.0	16.1	25.5	12.8	0.0	7.8	17.7	-0.1	3.5	**500.9**
0.3	0.1	0.1	-	0.1	0.4	0.3	2.0	1.5	0.3	0.8	1.4	7.7	0.4	1.4	0.6	1.4	3.0	0.5	1.1	11.7	582.7	-0.0	5.3	8.9	-	288.5	**942.5**
0.2	0.0	0.0	-	0.0	0.1	0.0	0.3	0.3	0.1	0.4	1.7	1.2	6.2	2.6	0.4	0.4	0.8	5.0	0.7	9.2	239.3	-	1.1	5.2	-	58.1	**337.5**
0.0	0.0	0.0	-	0.0	0.2	0.1	0.1	0.2	0.1	0.2	0.4	1.6	0.4	0.7	1.5	0.4	0.4	0.4	0.8	7.3	208.8	0.0	0.3	8.1	-	47.4	**282.6**
0.0	0.0	0.0	-	0.0	0.1	0.2	0.2	0.1	0.1	0.5	1.7	3.1	0.1	0.6	4.2	0.4	1.6	0.1	2.2	59.1	112.7	0.0	2.5	59.7	-0.0	51.7	**303.6**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	1.3	0.0	0.0	0.1	0.1	0.4	0.0	0.0	29.0	335.6	0.0	0.7	1.2	-	28.4	**397.5**
0.1	0.0	0.1	-	0.0	0.2	0.0	0.5	0.2	0.2	0.4	0.6	6.6	1.2	0.6	0.8	10.3	44.8	0.9	0.3	131.7	225.8	0.0	1.4	3.9	-0.0	48.1	**489.9**
0.1	0.0	0.2	-	0.2	0.7	2.7	1.2	0.5	0.6	0.9	15.8	3.4	4.6	2.2	1.3	0.3	1.0	16.3	2.0	203.2	19.8	0.0	0.9	16.8	-0.0	-142.7	**183.0**
0.6	0.0	0.1	-	0.0	0.2	0.2	0.7	3.0	0.2	0.8	4.7	4.7	9.1	1.3	1.8	3.2	3.3	1.5	13.5	137.0	5.9	0.0	0.7	6.1	-0.0	14.0	**232.8**
2.6	1.6	4.0	-	3.0	13.8	11.0	4.8	15.6	8.6	10.8	28.9	38.6	6.1	8.4	13.4	33.4	26.5	15.9	15.9	738.2	16.0	15.4	340.9	-	102.6	-	**2,398.7**
67.8	14.6	12.6	-	7.7	17.7	31.8	92.2	30.5	9.3	112.7	153.4	521.7	91.2	209.3	136.3	226.3	200.5	59.5	75.7	-	-	-	-	-	-	-	**3,999.8**
-9.3	-13.5	5.8	-	4.6	37.8	95.6	134.2	597.5	41.2	27.3	94.4	3.3	65.5	26.1	49.0	50.4	93.8	23.0	36.0	-	-	-	-	-	-	-	**2,437.5**
-6.5	7.3	-2.0	-	0.5	3.7	2.1	34.5	112.5	3.1	0.8	1.6	0.7	2.2	1.7	6.3	1.0	1.0	4.0	2.9	449.2	34.3	0.1	40.8	40.6	-	-	**930.9**
12.6	2.6	15.9	-	10.5	48.0	32.2	101.8	41.6	14.9	37.6	71.5	106.1	30.3	7.4	25.1	20.1	34.6	21.9	29.4	-	-	-	-	-	-	-548.2	**1,069.3**
116.4	**18.5**	**51.1**	**-**	**38.1**	**175.7**	**230.4**	**497.1**	**990.9**	**104.2**	**257.6**	**500.9**	**942.5**	**337.5**	**282.6**	**303.6**	**397.5**	**489.9**	**183.0**	**232.8**	**4,927.9**	**1,943.4**	**53.6**	**1,713.7**	**2,197.5**	**-**	**-**	**26,071.2**

B.9. Wellington Regional Table

Table B.9: 2009 I-O table of Wellington (Million NZD)

	Industries	1 HFRG	2 SBLC	3 DAIF	4 OTHF	5 SAHF	6 FOLO	7 FISH	8 COAL	9 FUEL	10 OMIN	11 MEAT	12 DAIR	13 OFOD	14 BEVT	15 TCFL	16 WOOD	17 PAPR	18 PPRM	19 CHEM	20 RBPL	21 NMMP	22 BASM	23 FABM	24 MAEQ	25 OMFG	26 ELEC	27 WATS	28 WAST	29 CONS	30 TRDE	31 ACCR
1	HFRG	0.1	0.3	0.9	0.1	0.4	0.1	0.0	0.0	0.0	0.0	1.3	-	1.7	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.1	4.1	4.4
2	SBLC	0.4	8.9	3.6	1.1	1.7	0.3	0.0	0.0	0.0	0.0	73.9	-	2.1	0.9	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.1	35.6	1.0
3	DAIF	0.1	0.6	0.6	0.1	0.3	0.0	0.0	0.0	0.0	0.0	-	61.9	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	1.5	0.2
4	OTHF	0.3	0.9	0.7	1.1	1.3	0.0	0.0	0.0	0.0	0.0	9.0	0.6	0.8	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	1.9	0.5
5	SAHF	0.8	1.6	1.1	0.4	2.8	1.4	0.0	0.0	0.0	0.0	2.3	-	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.4	0.0
6	FOLO	0.1	0.2	0.4	0.1	0.0	6.9	0.0	0.0	0.0	0.0	0.7	-	0.0	0.1	0.1	17.6	3.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	1.4	7.6	0.0
7	FISH	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	-	8.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.1
8	COAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	FUEL	0.5	2.5	2.4	1.9	9.0	4.6	0.9	2.9	235.6	3.6	2.9	3.5	6.2	1.9	2.9	5.0	5.1	25.7	57.2	5.5	2.2	1.6	3.6	7.0	3.1	98.3	0.0	2.2	41.5	94.0	4.6
10	OMIN	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.2	1.4	0.4	-	-	-	-	-	-	-	-	0.1	0.3	1.4	0.7	0.2	0.0	0.1	-	0.0	0.2	2.2	0.5	-
11	MEAT	0.0	0.1	0.5	0.2	0.1	0.0	0.0	0.0	0.0	0.0	7.6	-	0.6	-	4.0	-	-	1.5	-	1.7	-	-	-	-	-	-	-	-	-	0.7	19.5
12	DAIR	-	-	-	-	-	-	-	-	0.0	-	-	0.5	0.0	0.0	-	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.7
13	OFOD	0.1	0.5	2.0	0.7	0.3	0.0	0.5	0.0	0.0	0.0	1.4	1.0	28.7	2.7	0.1	0.3	0.2	0.7	0.2	0.7	0.0	0.0	0.1	0.3	0.1	0.0	0.0	0.0	0.1	16.2	27.1
14	BEVT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	16.6
15	TCFL	0.0	0.0	0.1	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	6.1	0.3	0.1	1.4	0.0	0.2	0.0	0.1	0.2	0.5	0.5	0.0	0.0	0.0	3.4	21.4	0.1
16	WOOD	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	15.3	1.5	0.5	0.0	0.2	0.7	0.1	0.4	0.5	9.6	0.0	0.0	0.0	70.8	5.1	0.0
17	PAPR	0.6	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.2	0.1	0.3	0.8	0.1	1.0	16.6	13.8	0.2	2.9	0.4	0.1	0.1	0.4	0.5	1.5	0.0	0.0	2.5	18.0	0.5
18	PPRM	0.1	0.2	0.1	0.2	1.0	0.1	0.0	0.0	0.5	0.0	1.2	0.9	3.2	2.0	0.9	1.6	3.2	27.2	1.1	4.2	0.6	0.2	2.0	3.2	1.5	2.0	0.0	0.3	6.1	118.2	4.9
19	CHEM	0.7	2.6	4.2	0.8	2.0	0.6	0.0	0.0	0.6	0.0	0.5	0.3	0.4	0.1	0.2	2.4	1.6	0.5	29.6	13.0	0.2	0.1	1.0	1.3	0.5	0.2	0.1	0.0	1.3	10.2	0.2
20	RBPL	1.1	1.6	2.8	1.0	0.8	0.7	0.0	0.0	0.5	0.0	7.0	5.1	9.7	0.9	0.7	2.7	1.2	8.0	3.3	28.1	0.3	0.2	2.9	6.2	2.2	0.2	0.2	0.3	26.1	58.9	3.4
21	NMMP	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.7	0.1	0.0	0.0	0.1	1.2	0.0	0.1	0.0	0.1	0.0	0.2	7.3	0.1	0.8	3.7	0.3	0.0	0.3	0.2	51.5	5.1	0.1
22	BASM	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.3	0.0	0.6	0.4	0.5	0.2	0.2	0.7	0.8	0.9	0.8	0.9	0.6	4.9	12.4	9.4	2.0	0.1	0.3	0.0	3.0	30.2	1.1
23	FABM	0.2	0.5	0.7	0.2	0.5	0.5	0.1	0.0	0.5	0.1	1.2	0.9	2.2	5.5	0.6	1.4	1.4	1.2	1.6	3.2	0.9	4.3	30.0	27.9	3.2	1.5	0.2	0.4	27.4	44.9	3.5
24	MAEQ	0.1	0.3	0.6	0.1	2.6	0.2	0.5	0.0	2.7	0.0	0.3	0.2	0.5	0.5	0.3	0.3	0.4	1.0	0.8	0.6	0.1	0.5	1.5	18.8	0.4	5.6	0.1	0.3	25.4	32.0	2.1
25	OMFG	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.1	0.1	0.4	0.0	0.3	0.1	0.1	0.6	1.2	3.1	0.0	0.2	0.0	6.9	6.3	1.9
26	ELEC	1.6	1.0	2.7	1.1	0.4	0.3	0.1	0.2	3.1	0.9	6.7	3.6	4.4	1.1	1.2	6.0	16.0	3.3	7.2	4.6	2.4	14.5	2.4	3.8	1.2	624.2	5.7	0.4	5.9	74.3	22.1
27	WATS	-	-	-	-	0.5	0.0	0.1	0.0	0.1	0.0	2.0	0.6	0.2	0.6	0.1	-	0.0	-	-	-	-	-	-	0.1	-	0.3	37.1	0.0	0.3	7.4	0.4
28	WAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.8	0.6	0.0	0.1	1.7	0.0	0.4	0.8	0.2	0.0	0.0	0.0	0.9	0.1	0.2	0.2	33.7	5.0	0.6	0.1
29	CONS	0.5	1.5	2.1	0.6	0.5	0.9	0.2	1.5	14.0	2.5	0.2	0.1	0.2	0.4	0.4	0.9	1.3	0.4	0.3	0.5	2.4	0.1	1.3	13.8	0.5	82.2	0.0	2.0	689.9	15.4	0.4
30	TRDE	2.1	6.6	10.2	2.8	9.2	3.1	0.7	0.3	3.2	0.5	8.0	5.9	18.8	7.3	8.3	6.1	6.9	10.8	9.0	4.8	1.6	5.8	8.5	24.4	4.0	6.6	-	2.6	89.1	346.7	54.1
31	ACCR	0.0	0.1	0.1	0.1	0.3	0.1	0.0	0.0	0.2	0.0	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.3	0.2	0.3	0.1	0.0	0.2	0.5	0.1	0.3	0.0	0.1	2.6	12.0	1.7
32	RDFR	0.8	1.4	0.7	0.9	1.9	8.9	0.1	0.2	0.7	0.3	6.8	7.0	8.5	2.0	1.5	5.7	2.6	4.9	15.1	5.1	2.7	3.0	2.4	4.2	1.8	0.3	0.1	0.7	5.6	117.4	0.2
33	RDPS	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.5	1.5	0.4
34	RFRT	0.1	0.2	0.1	0.1	-	1.0	-	1.2	-	0.5	2.2	0.8	1.3	0.4	0.5	0.9	1.9	1.5	4.5	1.6	0.5	0.6	0.8	1.1	0.6	-	-	-	0.4	4.3	-
35	WFRT	-	-	-	-	-	0.2	0.1	0.1	3.8	0.7	2.4	-	0.6	0.3	-	0.6	2.1	-	0.8	-	1.3	0.4	0.2	0.2	-	-	0.2	0.4	0.3	-	1.9
36	OFRT	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	-	0.5	0.1	0.5	0.1	0.1	0.2	0.4	0.2	0.4	0.2	0.0	0.1	0.1	0.3	0.1	0.1	-	-	0.3	10.7	-
37	OTTR	0.2	0.3	0.3	0.3	1.4	1.8	0.6	0.1	1.9	0.2	5.9	0.7	5.6	0.8	0.9	2.5	4.8	2.8	5.4	2.9	0.5	0.8	1.0	3.7	1.0	1.1	0.0	0.1	3.1	122.6	0.4
38	COMM	0.9	1.6	1.1	1.7	2.0	1.0	0.1	0.1	0.8	0.2	1.6	1.2	2.4	1.0	0.9	1.7	1.3	6.5	3.1	4.5	0.9	0.6	2.3	6.2	1.3	4.5	0.0	0.9	20.0	135.5	5.6
39	FIIN	4.0	5.3	3.1	3.3	9.9	4.0	1.6	0.2	3.5	0.3	3.7	2.7	7.4	8.2	2.6	5.7	3.0	10.9	7.0	8.2	1.8	7.3	5.1	9.8	2.9	21.4	0.5	1.3	26.6	394.0	20.9
40	HOUS	0.5	1.0	1.6	0.1	0.7	0.2	0.0	0.0	0.3	0.0	0.9	0.6	1.1	0.4	0.8	0.8	0.2	2.4	0.9	1.8	0.3	0.2	1.8	2.7	1.1	6.1	0.0	0.3	8.3	125.6	6.9
41	EHOP	0.4	0.5	0.4	0.2	1.2	0.6	0.3	0.1	0.3	0.2	0.5	0.4	1.3	0.2	0.2	0.8	0.3	1.7	1.6	0.8	0.2	0.2	0.5	1.4	0.3	3.0	0.4	0.6	2.9	20.0	1.2
42	SRCS	0.8	1.5	1.0	0.4	4.1	1.4	0.4	0.2	11.3	0.3	4.6	3.4	3.9	4.3	0.9	1.5	6.3	5.6	7.7	5.3	1.7	2.0	4.8	14.5	1.2	111.2	0.5	0.4	30.5	146.3	5.6
43	OBUS	2.8	5.7	3.8	5.0	6.4	6.2	0.7	0.2	4.9	0.4	8.7	6.4	17.6	13.6	5.7	9.4	4.1	24.1	10.7	21.5	4.2	2.1	9.7	22.3	5.8	33.9	1.7	2.5	79.8	629.9	40.0
44	GOVC	0.3	1.1	0.9	0.3	0.4	0.5	0.1	0.0	0.1	0.0	0.2	0.2	0.4	0.2	0.2	1.9	0.4	0.6	0.3	0.4	0.3	0.1	0.4	0.7	0.6	0.8	0.0	0.3	3.8	25.1	1.8
45	GOVL	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.4	0.0	0.6	0.1	0.1	0.1	0.1	0.1	0.2	0.0	0.2	0.1	0.1	1.9	0.0	0.1	0.2	0.0	-	-	1.9	0.9	1.9	0.1
46	SCHL	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.3	0.0	0.8	0.0	0.2	0.0	0.0	0.2	0.2	0.0	0.9	0.0	0.0	0.4	2.8	0.2
47	OEDU	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.6	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.1	0.0	1.5	0.0	0.0	1.1	2.5	0.2
48	HOSP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	0.0
49	OHCS	0.1	0.5	1.5	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.2	0.0	0.1	0.2	0.3	0.0	0.2	0.1	0.0	0.1	0.2	0.0	0.4	0.0	0.0	0.5	3.9	0.1
50	CULT	0.3	0.7	0.5	0.3	1.2	0.1	0.0	0.0	0.2	0.0	1.2	0.9	2.6	1.5	0.5	0.7	0.3	6.1	0.8	3.8	0.7	0.1	0.7	2.2	0.6	1.6	0.0	0.1	2.5	73.9	4.5
51	PERS	0.0	0.1	0.2	0.0	1.0	0.5	0.1	0.0	0.1	0.0	4.1	3.0	0.8	0.7	0.8	0.1	0.1	3.6	0.4	0.7	0.1	0.0	0.6	1.0	0.1	4.6	0.0	0.0	4.5	18.4	0.8
	Other Imports	5.3	15.6	9.7	6.0	12.9	5.6	3.6	0.1	-	0.6	18.9	17.1	70.0	22.1	32.8	13.4	21.1	90.8	80.6	129.2	11.3	11.5	52.9	111.8	28.4	9.3	0.8	1.0	701.4	446.1	43.8
	Compensation of Employees	18.4	56.8	29.9	10.2	19.6	14.9	3.2	-	26.4	4.2	40.3	4.6	58.4	14.4	36.2	37.5	19.7	128.6	7.3	76.6	20.5	12.1	66.5	122.3	40.1	112.8	12.7	18.6	579.9	1,215.1	234.7
	Depreciation + Op Surplus	13.3	-7.4	32.4	5.6	93.3	19.8	2.8	6.2	164.0	7.2	41.4	118.1	56.5	39.7	20.8	42.3	51.5	75.6	112.3	59.4	29.7	62.5	44.7	117.5	25.4	354.6	46.7	50.6	404.4	1,689.1	149.7
	Net Indirect Taxes	1.9	-5.8	6.4	2.2	4.5	0.8	-0.0	0.9	107.0	0.5	2.2	4.0	2.1	91.4	0.5	1.7	1.8	3.7	3.4	3.8	2.3	0.9	2.3	2.4	0.9	6.7	0.5	2.2	35.8	118.7	21.0
	Domestic Import	10.8	43.1	44.0	12.8	37.0	34.8	3.9	1.7	18.7	3.6	196.0	333.1	95.6	30.5	25.7	81.5	34.6	32.1	111.2	67.8	27.3	31.2	71.7	99.0	28.1	44.3	2.2	9.9	349.0	629.7	194.1
	Gross Output	**70.6**	**152.9**	**174.3**	**62.4**	**232.7**	**123.3**	**21.5**	**17.2**	**608.1**	**28.2**	**470.0**	**591.2**	**427.8**	**262.1**	**161.4**	**274.0**	**216.1**	**501.8**	**486.9**	**467.0**	**129.9**	**169.4**	**337.4**	**648.1**	**173.3**	**1,542.3**	**110.7**	**134.4**	**3,325.3**	**6,912.3**	**905.6**

Table B.9: 2009 I-O table of Wellington (Million NZD) – Continuation (right hand side)

32 RDFR	33 RDPS	34 RFRT	35 WFRT	36 OFRT	37 OTTR	38 COMM	39 FIIN	40 HOUS	41 EHOP	42 SRCS	43 OBUS	44 GOVC	45 GOVL	46 SCHL	47 OEDU	48 HOSP	49 OHCS	50 CULT	51 PERS	Private Consumption	Government Consumption	Stock Change	Gross Investment	Exports	Import Adjustments	Final Demand	Gross Output
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.1	0.3	0.3	0.0	0.0	0.0	0.8	0.0	0.1	0.0	63.0	0.9	-0.1	0.2	31.1	-0.0	-41.7	**70.6**
0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.2	0.2	0.3	0.1	0.4	0.0	0.0	0.0	0.1	0.0	1.7	0.0	9.5	0.1	0.0	0.1	6.9	-0.0	0.0	**152.9**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.2	0.0	2.4	0.7	0.0	0.1	0.9	-	103.6	**174.3**
0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.2	0.3	0.0	0.1	0.6	0.0	0.0	0.0	0.2	0.1	0.9	0.0	23.0	0.8	0.0	0.3	8.8	-0.0	9.0	**62.4**
0.2	0.0	0.1	0.1	0.0	0.4	0.0	0.2	0.0	0.3	0.1	5.8	1.9	0.0	0.0	0.0	0.0	0.2	1.2	0.1	3.5	1.5	0.0	20.9	6.4	-0.0	177.3	**232.7**
0.7	0.0	0.0	0.0	0.0	0.3	0.0	0.2	0.1	0.1	0.1	16.0	0.2	0.1	0.1	0.0	0.0	0.0	0.1	0.0	8.5	0.3	10.6	1.3	27.7	-0.0	17.9	**123.3**
0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.8	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.2	0.0	3.3	-0.0	5.4	**21.5**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.9	0.1	-	0.6	2.8	-	11.9	**17.2**
50.5	9.8	5.6	32.7	4.5	91.6	3.7	3.8	2.8	1.4	12.2	9.7	63.3	8.0	1.2	3.5	4.4	6.8	3.5	2.7	234.4	4.5	-1.8	68.1	152.0	-315.9	-492.9	**608.1**
0.3	0.0	0.4	-	-	0.0	0.0	0.0	0.0	0.0	0.1	0.1	-	-	-	-	-	-	-	-	0.7	0.3	0.0	0.5	6.2	-0.3	11.6	**28.2**
-	-	-	-	0.0	0.1	-	-	-	-	-	-	1.3	-	0.0	0.2	0.2	0.0	0.7	0.0	330.0	6.1	-	0.4	260.9	-0.0	-166.7	**470.0**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	-	0.0	0.0	0.0	0.0	0.0	-	0.0	177.8	2.4	-9.1	0.5	513.3	-	-98.5	**591.2**
0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.7	0.1	0.1	0.2	0.6	0.7	0.0	0.0	0.2	2.7	0.2	2.5	0.0	370.7	1.9	-0.3	1.2	153.1	-0.0	-191.1	**427.8**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	1.1	0.0	414.0	6.0	0.9	0.2	68.5	-0.0	-248.6	**262.1**
0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.1	4.3	0.0	0.2	1.2	3.6	0.1	0.2	0.5	0.2	0.1	1.4	0.0	62.2	0.8	2.1	0.7	70.3	-0.0	-22.0	**161.4**
0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	1.4	0.0	7.9	0.6	0.5	0.0	0.2	0.3	0.1	0.0	0.2	1.5	5.3	0.9	1.9	2.2	91.2	-0.0	54.2	**274.0**
0.4	0.2	0.2	0.2	0.1	1.4	0.1	1.0	6.6	0.0	3.4	29.5	0.3	0.1	0.1	0.3	0.2	0.7	0.1	0.0	45.9	0.9	0.1	0.2	85.0	-0.0	-21.9	**216.1**
2.3	0.8	1.2	1.3	0.5	9.1	18.0	37.1	5.0	2.7	21.1	120.9	27.6	0.9	2.9	5.0	1.9	5.2	19.7	13.2	71.5	1.1	2.1	3.0	37.8	-0.2	-97.0	**501.8**
1.1	0.2	0.3	0.3	0.1	1.9	0.1	0.1	0.1	0.1	0.3	1.2	0.9	0.1	0.1	0.2	0.9	0.8	0.3	0.7	14.0	0.2	0.6	0.5	64.6	-0.5	322.3	**486.9**
0.1	0.6	0.1	0.1	0.0	1.0	1.0	1.6	4.6	0.6	3.3	18.4	6.1	0.6	0.5	1.3	5.1	5.1	1.3	5.4	81.1	13.8	0.2	9.7	95.2	-0.5	34.3	**467.0**
0.9	0.3	0.0	0.0	0.0	0.1	0.3	0.2	1.2	1.0	5.8	0.4	0.1	0.0	0.2	0.1	0.0	0.1	0.0	0.3	7.2	0.1	0.0	1.4	9.0	-0.3	28.9	**129.9**
0.1	0.0	0.0	0.0	0.0	0.2	0.0	1.6	0.1	0.1	4.7	1.8	0.2	0.0	0.2	0.1	0.0	0.2	0.5	0.0	4.0	0.1	0.0	1.5	56.3	-0.1	26.6	**169.4**
0.3	0.1	0.4	0.5	0.2	3.2	1.0	2.9	10.0	0.7	4.2	2.1	7.5	0.8	0.4	0.7	0.4	0.1	0.9	0.1	18.1	0.5	2.7	13.6	34.2	-0.2	65.2	**337.4**
2.1	1.7	3.3	3.5	1.2	24.2	16.9	1.4	1.7	2.5	5.9	9.4	26.7	4.5	1.5	5.0	3.7	0.6	7.9	1.6	121.7	0.5	4.8	138.6	206.6	-3.4	-45.0	**648.1**
0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.2	6.1	0.2	0.3	0.5	1.0	0.4	0.2	0.2	0.1	0.1	0.4	0.7	70.3	1.0	4.6	44.7	37.6	-0.0	-17.8	**173.3**
1.2	0.6	3.6	0.2	0.5	9.5	11.3	10.5	0.7	1.1	13.6	18.2	33.8	13.0	4.2	14.3	4.4	6.4	16.2	3.5	351.3	5.4	0.0	39.4	3.9	-	153.0	**1,542.3**
0.0	0.0	0.1	0.1	0.0	0.4	-	0.0	32.1	-	0.1	0.0	1.0	6.3	0.0	0.0	0.2	0.3	0.0	-	0.2	0.1	-	2.9	0.0	-0.0	17.2	**110.7**
0.1	0.0	0.0	0.0	0.0	0.2	0.1	5.6	0.4	0.0	0.1	2.1	18.1	12.5	0.7	0.5	2.1	4.4	0.1	9.5	1.7	0.1	0.0	0.2	0.0	-	29.9	**134.4**
2.4	1.7	1.4	1.5	0.5	10.4	21.6	19.5	209.4	1.3	7.9	6.7	196.3	119.7	3.8	24.1	5.0	14.8	37.3	14.1	29.5	0.9	0.6	1,875.3	21.1	-0.0	-138.4	**3,325.3**
57.0	16.8	4.6	5.4	1.8	35.6	26.1	37.7	36.9	10.8	20.9	86.9	78.8	5.5	6.2	8.6	18.9	12.0	14.4	0.9	2,674.4	75.4	84.2	647.9	1,408.3	-0.5	868.8	**6,912.3**
0.8	0.2	1.3	1.4	0.5	9.5	0.6	4.2	0.4	0.4	4.1	6.6	65.5	1.3	4.0	6.8	3.4	9.7	7.7	3.5	617.0	9.0	0.6	1.2	257.6	-0.0	-131.4	**905.6**
157.5	0.9	2.0	2.2	0.8	15.1	6.7	3.1	0.2	1.8	2.9	12.3	8.8	1.4	0.3	0.7	0.3	0.9	4.7	3.7	25.4	4.7	0.0	3.8	15.7	-	606.3	**1,095.2**
2.3	2.0	0.3	0.3	0.1	1.9	0.2	2.8	0.0	0.3	4.6	5.9	5.7	0.1	2.1	2.5	0.6	2.3	4.4	2.8	50.3	23.4	0.1	1.0	25.2	-	29.5	**174.0**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24.3	1.0	-	3.1	-	-	153.8	**209.2**
21.5	3.9	25.2	-	0.1	2.5	5.1	1.7	-	-	-	-	-	-	-	-	-	-	-	-	11.3	0.9	-	9.3	-	-	130.7	**228.6**
1.4	-	0.7	1.1	1.1	21.3	1.3	1.6	0.1	0.4	2.4	4.7	4.7	0.2	0.0	0.3	0.1	0.2	1.4	0.4	17.4	1.0	0.0	0.9	28.8	-0.1	-22.9	**83.1**
20.8	0.8	12.9	12.1	12.5	244.6	15.5	18.6	1.0	4.7	27.1	53.5	54.1	2.0	0.5	3.8	1.0	2.0	15.7	4.8	140.8	2.7	0.6	17.6	564.3	-1.9	248.2	**1,654.0**
45.0	3.7	2.7	2.9	1.0	20.1	337.3	83.0	4.3	4.4	52.8	96.7	104.6	10.4	2.1	13.7	5.4	11.5	45.7	15.4	336.5	7.2	-0.2	43.6	128.5	-0.1	307.3	**1,896.9**
27.6	8.7	13.9	14.7	5.2	102.6	34.5	1,696.0	147.8	32.5	86.7	227.2	229.5	16.2	3.5	19.7	14.3	37.9	105.1	58.0	491.1	9.8	0.2	60.2	136.2	-0.5	1,554.2	**5,718.8**
6.4	1.1	1.6	1.7	0.6	11.7	8.7	41.8	110.7	3.5	18.8	46.7	87.9	1.4	0.7	3.6	1.4	12.8	35.3	7.9	2,799.5	61.3	0.0	138.2	30.9	-0.0	-472.2	**3,129.6**
8.3	3.3	10.1	10.7	3.8	74.6	2.9	12.7	2.7	15.9	14.3	20.7	28.7	7.8	0.2	2.9	2.3	3.8	10.7	4.7	22.3	5.1	0.3	6.0	53.1	-0.1	0.5	**370.7**
1.5	1.9	2.9	3.1	1.1	21.5	32.0	219.0	2.0	5.7	321.8	134.6	185.4	34.7	1.2	3.6	10.1	15.4	63.7	15.5	24.0	58.8	0.8	321.4	90.2	-1.2	328.5	**2,283.1**
24.4	9.3	9.9	10.5	3.7	73.2	115.4	340.8	36.9	29.2	178.4	581.2	407.9	33.8	11.8	40.6	27.3	58.9	199.7	99.8	79.7	26.7	0.1	69.1	156.9	-1.1	825.4	**4,439.3**
3.2	0.6	0.5	0.5	0.2	3.7	2.2	22.6	4.7	1.1	7.2	12.2	40.4	0.9	3.0	1.2	2.8	6.2	6.7	3.9	36.7	1,211.5	-0.2	27.5	46.4	-	3,446.2	**4,934.3**
1.9	0.1	0.1	0.1	0.0	0.5	0.3	3.1	0.8	0.4	3.5	15.3	6.4	12.9	5.4	0.8	0.8	1.6	64.8	2.4	28.6	497.6	-	2.2	10.9	-	32.7	**702.4**
0.2	0.1	0.2	0.2	0.1	1.3	0.9	1.4	0.6	0.2	1.6	3.1	7.2	0.7	1.4	2.7	0.7	0.7	4.0	2.4	22.9	434.2	0.0	0.6	16.9	-	81.9	**592.8**
0.1	0.1	0.1	0.1	0.0	0.8	1.8	2.1	0.4	0.3	4.3	15.2	16.4	0.2	1.2	8.9	0.7	3.2	1.1	7.9	184.5	234.2	0.1	5.3	125.2	-0.0	15.5	**636.8**
0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.2	0.0	0.0	1.1	0.6	6.5	0.0	0.0	0.2	0.2	0.8	0.1	0.2	90.5	697.6	0.0	1.4	2.5	-	20.2	**823.5**
0.5	0.2	0.2	0.3	0.1	1.8	0.4	4.9	0.6	0.6	3.4	4.8	32.2	2.4	1.2	1.6	19.9	86.1	10.6	1.2	411.0	469.4	0.1	2.9	8.1	-0.0	-58.4	**1,015.0**
1.2	0.5	1.1	1.2	0.4	8.4	28.2	16.7	2.0	2.9	9.7	176.1	22.4	11.9	5.7	3.3	0.7	2.7	266.2	9.2	634.1	41.2	0.3	11.7	218.6	-0.0	790.3	**2,375.2**
5.5	0.3	0.2	0.2	0.1	1.7	1.9	8.1	9.8	0.6	7.1	43.5	25.8	20.0	2.9	4.0	7.0	7.3	20.2	51.2	427.7	12.2	0.2	2.5	21.9	-0.0	114.1	**842.6**
24.9	15.4	16.5	20.8	6.5	129.6	90.9	55.0	49.3	30.7	95.8	255.8	202.0	12.7	17.6	28.2	69.1	54.9	206.8	57.5	2,303.8	55.4	53.5	1,184.8	-	326.9	-	**7,338.0**
80.6	34.3	50.6	39.7	16.4	199.9	302.8	896.5	69.9	30.4	981.7	1,099.9	2,306.6	191.3	391.3	464.0	556.9	389.5	349.5	312.8	-	-	-	-	-	-	-	**11,807.3**
240.7	95.9	25.1	42.0	10.3	325.4	747.1	1,674.9	1,909.1	149.0	259.0	1,091.6	364.2	134.7	99.6	-55.0	18.1	219.9	658.5	94.4	-	-	-	-	-	-	-	**12,034.5**
168.2	-51.7	-8.6	-	1.1	32.2	16.3	431.0	359.5	11.1	7.8	18.0	82.1	4.6	6.6	-7.1	0.4	2.3	113.6	7.5	1,402.0	119.2	0.3	141.7	140.9	-	-	**3,425.7**
130.4	9.6	18.2	17.1	8.1	159.4	43.4	51.7	91.9	20.9	74.6	180.1	167.9	28.1	7.8	20.6	28.2	25.9	66.0	21.0	-	-	-	-	-	-	-8,356.1	**-4,480.1**
1,095.2	**174.0**	**209.2**	**228.6**	**83.1**	**1,654.0**	**1,896.9**	**5,718.8**	**3,129.6**	**370.7**	**2,283.1**	**4,439.3**	**4,934.3**	**702.4**	**592.8**	**636.8**	**823.5**	**1,015.0**	**2,375.2**	**842.6**	**15,379.4**	**4,110.7**	**161.4**	**4,932.1**	**5,541.8**	**-**	**-**	**83,068.8**

B.10. Tasman Regional Table

Table B.10: 2009 I-O table of Tasman (Million NZD)

Industries		1 HFRG	2 SBLC	3 DAIF	4 OTHF	5 SAHF	6 FOLO	7 FISH	8 COAL	9 FUEL	10 OMIN	11 MEAT	12 DAIR	13 OFOD	14 BEVT	15 TCFL	16 WOOD	17 PAPR	18 PPRM	19 CHEM	20 RBPL	21 NMMP	22 BASM	23 FABM	24 MAEQ	25 OMFG	26 ELEC	27 WATS	28 WAST	29 CONS	30 TRDE	31 ACCR
1	HFRG	3.7	1.8	5.2	0.2	0.5	0.9	0.0	0.0	0.0	0.0	1.3	-	1.8	1.5	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.8	2.0
2	SBLC	5.1	25.9	10.5	1.6	1.0	0.9	0.0	0.0	0.0	0.0	38.0	-	1.1	0.5	0.1	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	3.5	0.2
3	DAIF	2.2	4.1	3.6	0.4	0.4	0.1	0.0	0.0	0.0	0.0	-	71.4	0.3	0.2	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.3	0.1
4	OTHF	4.1	2.6	2.1	1.6	0.7	0.1	0.0	0.0	0.0	0.0	4.5	0.3	0.4	0.1	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.2	0.1
5	SAHF	22.0	9.5	6.6	1.2	3.4	9.8	0.0	0.0	0.0	0.0	2.5	-	0.1	0.0	0.0	0.1	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.0
6	FOLO	1.0	0.8	1.4	0.1	0.0	29.5	0.0	0.0	0.0	0.0	0.5	-	0.0	0.1	0.0	29.9	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.9	0.0
7	FISH	0.0	0.0	0.0	0.0	0.0	0.0	3.2	0.0	0.0	0.0	0.0	-	6.3	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
8	COAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	FUEL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	OMIN	1.1	0.9	1.3	0.2	0.0	0.1	0.0	0.3	0.5	0.6	-	-	-	-	-	-	-	-	0.0	0.0	2.0	0.1	0.1	0.0	0.0	-	0.0	0.0	1.0	0.1	-
11	MEAT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	-	0.0	-	0.0	-	-	0.0	-	0.0	-	-	-	-	-	-	-	-	-	0.0	0.1
12	DAIR	-	-	-	-	-	-	-	-	0.0	-	-	1.0	0.1	0.0	-	0.4	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.6
13	OFOD	0.9	1.1	4.7	0.8	0.2	0.1	1.3	0.0	0.0	0.0	0.6	0.4	12.0	1.1	0.0	0.3	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	5.0
14	BEVT	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.9	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	6.0
15	TCFL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.0
16	WOOD	0.1	0.1	0.1	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	17.4	-	0.0	0.0	0.0	0.4	0.0	0.1	0.1	0.9	0.0	0.0	0.0	12.7	0.4	0.0
17	PAPR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	PPRM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	0.0
19	CHEM	10.7	9.0	14.6	1.5	1.4	2.6	0.1	0.0	0.1	0.0	0.3	0.2	0.3	0.1	0.0	4.0	-	0.0	2.0	0.5	0.1	0.0	0.3	0.2	0.1	0.0	0.0	0.0	0.3	1.2	0.0
20	RBPL	0.9	0.3	0.5	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.2	0.3	0.0	0.0	0.2	-	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0
21	NMMP	0.3	0.2	0.3	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.6	0.0	0.1	-	0.0	0.0	0.0	4.5	0.0	0.2	0.5	0.0	0.0	0.0	0.0	10.8	0.5	0.0
22	BASM	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	-	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0
23	FABM	1.6	1.1	1.5	0.2	0.2	1.1	0.2	0.0	0.1	0.0	0.4	0.3	0.8	2.0	0.0	1.3	-	0.0	0.1	0.1	0.4	0.1	5.0	2.5	0.3	0.1	0.0	0.0	4.1	3.1	0.6
24	MAEQ	0.4	0.3	0.6	0.1	0.5	0.2	0.6	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.1	-	0.0	0.0	0.0	0.0	0.0	0.1	0.8	0.0	0.2	0.0	0.0	1.8	1.1	0.2
25	OMFG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.3	0.1	0.1
26	ELEC	5.0	0.7	1.9	0.4	0.1	0.3	0.1	0.0	0.1	0.1	0.8	0.4	0.5	0.1	0.0	1.9	-	0.0	0.1	0.0	0.4	0.1	0.1	0.1	0.0	16.0	0.1	0.0	0.3	1.7	1.2
27	WATS	-	-	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	-	-	-	-	-	-	-	-	0.0	-	0.0	0.2	0.0	0.0	0.1	0.0
28	WAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.0	1.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.5	0.0	0.0
29	CONS	2.6	1.8	2.5	0.4	0.1	1.2	0.2	0.4	0.8	0.6	0.0	0.0	0.0	0.1	0.0	0.5	-	0.0	0.0	0.0	0.6	0.0	0.1	0.7	0.0	3.6	0.0	0.1	58.7	0.6	0.0
30	TRDE	11.0	7.5	11.6	1.6	2.2	4.1	1.0	0.1	0.2	0.1	1.6	1.2	3.8	1.5	0.2	3.3	-	0.1	0.2	0.1	0.4	0.1	0.8	1.2	0.2	0.3	-	0.1	7.5	13.4	4.8
31	ACCR	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.5	0.2
32	RDFR	6.2	2.4	1.2	0.8	0.7	18.1	0.3	0.1	0.1	0.1	2.1	2.1	2.6	0.6	0.0	4.6	-	0.0	0.5	0.1	1.0	0.1	0.4	0.3	0.1	0.0	0.0	0.0	0.7	6.9	0.0
33	RDPS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
34	RFRT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	WFRT	-	-	-	-	-	0.3	0.1	0.0	0.2	0.2	0.5	-	0.1	0.1	-	0.3	-	-	0.0	-	0.3	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	0.2
36	OFRT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	OTTR	0.6	0.2	0.1	0.1	0.2	1.2	0.4	0.0	0.1	0.0	0.6	0.1	0.6	0.1	0.0	0.7	-	0.0	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	2.4	0.0
38	COMM	1.0	0.4	0.3	0.2	0.1	0.3	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.2	-	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.4	1.2	0.1
39	FIIN	7.5	2.2	1.3	0.7	0.9	1.9	0.8	0.0	0.1	0.0	0.3	0.2	0.6	0.6	0.0	1.1	-	0.0	0.1	0.0	0.2	0.0	0.2	0.2	0.0	0.3	0.0	0.0	0.8	5.6	0.7
40	HOUS	3.2	1.5	2.3	0.1	0.2	0.4	0.0	0.0	0.0	0.0	0.2	0.2	0.3	0.1	0.0	0.5	-	0.0	0.0	0.0	0.1	0.0	0.2	0.2	0.1	0.3	0.0	0.0	0.9	6.2	0.8
41	EHOP	0.8	0.2	0.2	0.0	0.1	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.0
42	SRCS	1.6	0.6	0.4	0.1	0.4	0.7	0.2	0.0	0.2	0.0	0.3	0.3	0.3	0.3	0.0	0.3	-	0.0	0.1	0.0	0.2	0.0	0.2	0.3	0.0	1.7	0.0	0.0	0.9	2.1	0.2
43	OBUS	6.9	3.1	2.1	1.4	0.7	3.9	0.5	0.0	0.1	0.0	0.8	0.6	1.7	1.3	0.1	2.4	-	0.1	0.1	0.1	0.5	0.0	0.4	0.5	0.1	0.7	0.0	0.0	3.2	11.6	1.7
44	GOVC	0.2	0.2	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
45	GOVL	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	-	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	-	-	0.1	0.1	0.1	0.0
46	SCHL	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
47	OEDU	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	HOSP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	OHCS	0.2	0.3	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
50	CULT	1.3	0.6	0.4	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.4	0.2	0.0	0.3	-	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.2	2.2	0.3
51	PERS	0.1	0.1	0.2	0.0	0.1	0.4	0.1	0.0	0.0	0.0	0.5	0.4	0.1	0.1	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.4	0.0
	Other Imports	25.8	16.7	10.4	3.2	2.8	7.0	4.5	0.0	-	0.1	3.6	3.2	13.3	4.2	0.6	6.8	-	0.5	1.7	1.6	2.6	0.2	4.8	5.4	1.2	0.4	0.0	0.0	55.6	16.3	3.7
	Compensation of Employees	102.9	20.0	24.6	4.9	18.3	35.1	5.1	-	-	2.5	0.3	6.3	23.3	6.8	1.0	36.0	-	1.1	1.4	1.0	5.2	0.3	9.8	8.1	1.4	3.1	0.2	2.2	48.1	89.7	22.6
	Depreciation + Op Surplus	52.6	15.0	40.9	3.4	7.2	9.1	2.4	1.5	9.6	0.3	14.8	17.1	-1.1	6.3	0.1	4.9	-	0.1	1.1	0.7	6.5	0.8	0.4	3.5	1.4	15.7	0.8	-0.0	30.1	19.4	10.2
	Net Indirect Taxes	7.7	11.7	8.1	1.3	0.4	0.4	-0.0	0.2	6.2	0.0	0.8	0.6	-0.0	14.5	0.0	0.2	-	0.0	0.0	0.0	0.5	0.0	0.0	0.1	0.0	0.3	0.0	-0.0	2.7	1.4	1.4
	Domestic Import	50.7	20.6	23.8	6.7	7.9	23.1	5.7	1.2	13.7	1.5	12.7	5.0	10.5	5.2	0.7	18.1	-	0.7	2.5	1.2	3.5	0.6	6.5	5.8	1.2	18.9	0.6	0.2	20.0	53.3	12.9
	Gross Output	**342.5**	**163.6**	**186.5**	**33.6**	**51.3**	**154.8**	**26.9**	**4.0**	**32.3**	**6.6**	**89.1**	**112.0**	**81.1**	**49.7**	**3.0**	**138.0**	**-**	**2.8**	**10.1**	**5.8**	**30.2**	**2.5**	**30.4**	**31.2**	**7.5**	**62.0**	**2.0**	**4.2**	**263.5**	**252.5**	**76.4**

Table B.10: 2009 I-O table of Tasman (Million NZD) – Continuation (right hand side)

32 RDFR	33 RDPS	34 RFRT	35 WFRT	36 OFRT	37 OTTR	38 COMM	39 FIIN	40 HOUS	41 EHOP	42 SRCS	43 OBUS	44 GOVC	45 GOVL	46 SCHL	47 OEDU	48 HOSP	49 OHCS	50 CULT	51 PERS	Private Consumption	Government Consumption	Stock Change	Gross Investment	Exports	Import Adjustments	Final Demand	Gross Output
0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	3.1	0.1	-0.4	1.1	150.6	-0.0	167.9	**342.5**
0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.5	0.0	0.0	0.1	7.4	-0.0	66.7	**163.6**
0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.9	-	101.9	**186.5**
0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.1	0.0	0.1	4.7	-0.0	10.4	**33.6**
0.0	0.0	-	0.0	-	0.1	0.0	0.0	0.0	0.1	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.2	0.0	4.6	1.4	-0.0	-11.9	**51.3**
0.1	0.0	-	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	13.3	1.7	34.8	-0.0	38.6	**154.8**
0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	4.1	-0.0	12.5	**26.9**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.0	-	0.1	0.7	-	3.2	**4.0**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.5	0.4	-0.1	3.6	8.1	-16.8	25.6	**32.3**
0.1	0.0	-	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.1	1.4	-0.1	-3.4	**6.6**
-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	16.2	0.6	-	0.1	49.4	-0.0	22.4	**89.1**
0.0	0.0	-	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	8.7	0.2	-1.7	0.1	97.3	-	4.2	**112.0**
0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.0	18.2	0.2	-0.1	0.2	29.0	-0.0	3.1	**81.1**
0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	20.3	0.6	0.2	0.0	13.0	-0.0	8.1	**49.7**
0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1	0.1	0.0	0.0	1.3	-0.0	-2.5	**3.0**
0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.3	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.1	0.9	1.1	45.9	-0.0	55.8	**138.0**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.3	0.1	-	-	-	-	-2.3	**-**
0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.1	0.0	0.0	0.2	-0.0	-2.8	**2.8**
0.1	0.0	-	0.0	-	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.7	0.0	0.0	0.0	1.3	-0.0	-42.5	**10.1**
0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	1.3	0.0	0.1	1.2	-0.0	-4.8	**5.8**
0.1	0.0	-	0.0	-	0.0	0.0	0.0	0.3	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.3	2.1	-0.1	7.9	**30.2**
0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.8	-0.0	0.5	**2.5**
0.0	0.0	-	0.0	-	0.2	0.0	0.1	1.6	0.1	0.2	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.9	0.1	0.2	1.2	3.1	-0.0	-4.7	**30.4**
0.1	0.0	-	0.1	-	0.7	0.2	0.0	0.1	0.1	0.1	0.2	0.1	0.3	0.1	0.2	0.1	0.0	0.1	0.0	6.0	0.0	0.2	6.7	10.0	-0.2	-1.7	**31.2**
0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.1	0.2	1.9	1.6	-0.0	-1.0	**7.5**
0.0	0.0	-	0.0	-	0.2	0.1	0.1	0.0	0.0	0.2	0.3	0.1	0.6	0.1	0.3	0.1	0.1	0.1	0.1	17.3	0.5	0.0	1.6	0.2	-	7.4	**62.0**
0.0	0.0	-	0.0	-	0.0	-	0.0	0.8	-	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	-	0.1	0.0	-0.0	0.5	**2.0**
0.0	0.0	-	0.0	-	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	1.0	0.0	0.0	0.1	0.2	0.0	0.4	0.1	0.0	0.0	0.0	0.0	-	-1.2	**4.2**
0.1	0.1	-	0.1	-	0.4	0.3	0.2	18.8	0.1	0.2	0.2	0.7	8.9	0.2	1.0	0.2	0.5	0.5	0.5	1.4	0.1	0.0	148.6	1.7	-0.0	3.2	**263.5**
1.9	0.6	-	0.2	-	1.2	0.4	0.5	3.3	0.7	0.5	2.0	0.3	0.4	0.3	0.3	0.7	0.4	0.2	0.0	131.3	7.4	3.1	23.7	51.4	-0.0	-58.0	**252.5**
0.0	0.0	-	0.1	-	0.3	0.0	0.1	0.0	0.0	0.1	0.1	0.2	0.1	0.2	0.3	0.1	0.3	0.1	0.1	30.3	0.9	0.0	0.1	21.7	-0.0	19.4	**76.4**
7.9	0.0	-	0.1	-	0.8	0.2	0.1	0.0	0.2	0.1	0.4	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.2	1.2	0.4	0.0	0.1	0.5	-	-30.7	**34.2**
0.1	0.1	-	0.0	-	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.1	2.5	2.3	0.0	0.0	0.8	-	-1.3	**5.4**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2	0.1	-	-	-	-	-1.3	**-**
0.7	0.1	-	-	-	0.1	0.1	0.0	-	-	-	-	-	-	-	-	-	-	-	-	0.6	0.1	-	0.4	-	-	5.3	**9.5**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.9	0.1	-	-	-	-	-1.0	**-**
0.4	0.0	-	0.3	-	4.1	0.1	0.1	0.0	0.2	0.3	0.6	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.1	6.9	0.3	0.0	0.6	17.6	-0.1	11.9	**51.7**
0.3	0.0	-	0.0	-	0.1	1.2	0.2	0.1	0.1	0.3	0.5	0.1	0.2	0.0	0.1	0.0	0.1	0.1	0.1	16.5	0.7	-0.0	0.7	1.9	-0.0	0.2	**28.4**
0.3	0.1	-	0.2	-	1.3	0.2	7.7	4.8	0.8	0.7	1.9	0.3	0.4	0.1	0.3	0.2	0.5	0.5	0.7	24.1	1.0	0.0	0.7	1.6	-0.0	-8.6	**66.3**
0.3	0.0	-	0.1	-	0.5	0.2	0.7	12.5	0.3	0.5	1.4	0.4	0.1	0.0	0.2	0.1	0.6	0.6	0.3	137.5	6.0	0.0	11.6	2.6	-0.0	67.8	**261.9**
0.1	0.0	-	0.2	-	0.9	0.0	0.1	0.1	0.4	0.1	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.1	1.1	0.5	0.0	0.4	3.4	-0.0	13.0	**23.5**
0.0	0.0	-	0.0	-	0.3	0.2	1.0	0.1	0.1	2.7	1.1	0.2	0.9	0.0	0.1	0.1	0.2	0.3	0.2	1.2	5.8	0.0	6.9	1.9	-0.0	14.5	**49.1**
0.4	0.1	-	0.2	-	1.2	0.9	2.0	1.6	0.9	1.9	6.3	0.7	1.2	0.2	0.8	0.5	1.0	1.3	1.6	3.9	2.6	0.0	1.5	3.4	-0.0	16.8	**95.5**
0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	118.5	-0.0	0.1	0.1	-	-106.2	**15.7**
0.1	0.0	-	0.0	-	0.0	0.0	0.0	0.1	0.0	0.1	0.3	0.0	0.8	0.2	0.0	0.0	0.0	0.8	0.1	1.4	48.7	-	0.2	0.8	-	-6.0	**48.7**
0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1	1.1	42.5	0.0	0.0	0.6	-	-23.0	**22.7**
0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	9.1	22.9	0.0	0.2	4.8	-0.0	-13.1	**24.3**
0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4	68.2	0.0	0.0	0.1	-	-45.3	**27.6**
0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.4	1.6	0.1	0.0	20.2	45.9	0.0	0.1	0.3	-0.0	-36.6	**34.0**
0.0	0.0	-	0.0	-	0.2	0.3	0.2	0.1	0.1	0.2	3.1	0.1	0.7	0.2	0.1	0.0	0.1	2.8	0.2	31.1	4.0	0.0	0.1	2.7	-0.0	-23.8	**29.9**
0.1	0.0	-	0.0	-	0.0	0.0	0.1	0.5	0.0	0.1	0.6	0.1	0.9	0.1	0.1	0.1	0.2	0.2	1.0	21.0	1.2	0.0	0.1	0.7	-0.0	-3.7	**26.4**
0.8	0.5	-	0.9	-	4.0	1.4	0.6	4.1	1.9	2.1	5.5	0.6	0.9	0.7	1.1	2.3	1.8	2.6	1.8	113.1	3.3	3.1	69.6	-	17.3	-	**436.3**
15.7	2.9	-	1.4	-	6.4	2.1	10.6	6.0	0.7	12.2	21.1	7.6	14.1	23.0	4.5	16.2	12.7	12.6	9.6	-	-	-	-	-	-	-	**660.5**
-0.2	-1.0	-	2.0	-	10.0	13.5	19.3	159.7	10.6	14.2	26.0	1.0	8.5	-3.7	9.7	3.0	7.7	1.3	3.2	-	-	-	-	-	-	-	**559.4**
-0.2	0.5	-	-	-	1.0	0.3	5.0	30.1	0.8	0.4	0.4	0.2	0.3	-0.2	1.2	0.1	0.1	0.2	0.3	68.9	7.0	0.0	8.3	8.3	-	-	**191.5**
5.0	1.1	-	3.3	-	17.3	6.5	17.5	15.9	4.6	10.8	20.3	2.7	7.4	1.1	3.4	2.6	5.3	4.8	5.4	-	-	-	-	-	-	-251.3	**219.0**
34.2	**5.4**	**-**	**9.5**	**-**	**51.7**	**28.4**	**66.3**	**261.9**	**23.5**	**49.1**	**95.5**	**15.7**	**48.7**	**22.7**	**24.3**	**27.6**	**34.0**	**29.9**	**26.4**	**755.3**	**395.1**	**19.6**	**299.1**	**597.5**	**-**	**-**	**5,177.3**

B.11. Nelson Regional Table

Table B.11: 2009 I-O table of Nelson (Million NZD)

	Industries	1 HFRG	2 SBLC	3 DAIF	4 OTHF	5 SAHF	6 FOLO	7 FISH	8 COAL	9 FUEL	10 OMIN	11 MEAT	12 DAIR	13 OFOD	14 BEVT	15 TCFL	16 WOOD	17 PAPR	18 PPRM	19 CHEM	20 RBPL	21 NMMP	22 BASM	23 FABM	24 MAEQ	25 OMFG	26 ELEC	27 WATS	28 WAST	29 CONS	30 TRDE	31 ACCR
1	HFRG	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.4	-	0.5	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	0.2	0.4
2	SBLC	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	1.8	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	0.1	0.0
3	DAIF	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	-	15.8	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	0.1	0.0
4	OTHF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	SAHF	0.2	0.2	0.1	-	0.6	0.3	0.1	0.0	0.0	0.0	2.2	-	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.2	0.0
6	FOLO	0.0	0.0	0.0	-	0.0	1.0	0.1	0.0	0.0	0.0	0.5	-	0.0	0.1	0.0	6.6	0.1	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.2	0.8	0.0
7	FISH	0.0	0.0	0.0	-	0.0	0.0	26.5	0.0	0.0	0.0	0.0	-	12.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.5	0.0
8	COAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	FUEL	0.0	0.1	0.1	-	0.4	0.2	4.5	0.0	5.9	0.1	0.5	0.6	1.1	0.3	0.2	0.5	0.0	1.3	1.5	0.1	0.1	-	0.2	0.5	0.1	0.2	-	0.1	1.7	2.8	0.3
10	OMIN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	MEAT	0.0	0.0	0.0	-	0.0	0.0	0.1	0.0	0.0	0.0	1.4	-	0.1	-	0.3	-	-	0.1	-	0.0	-	-	-	-	-	-	-	-	-	0.0	1.1
12	DAIR	-	-	-	-	-	-	-	-	0.0	-	-	0.1	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.1	0.0
13	OFOD	0.0	0.1	0.2	-	0.1	0.0	10.5	0.0	0.0	0.0	1.1	0.8	23.4	2.2	0.0	0.1	0.0	0.2	0.0	0.1	0.0	-	0.0	0.1	0.0	0.0	-	0.0	0.0	2.2	6.7
14	BEVT	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.1	2.4
15	TCFL	0.0	0.0	0.0	-	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.1	1.0	0.1	0.0	0.2	0.0	0.0	0.0	-	0.0	0.1	0.0	0.0	-	0.0	0.3	1.6	0.0
16	WOOD	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	7.4	0.1	0.1	0.0	0.0	0.1	-	0.1	0.1	0.9	0.0	-	0.0	13.2	0.7	0.0
17	PAPR	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.2	0.0
18	PPRM	0.0	0.0	0.0	-	0.1	0.0	0.1	0.0	0.0	0.0	0.5	0.3	1.2	0.7	0.1	0.3	0.1	2.7	0.1	0.2	0.0	-	0.2	0.4	0.1	0.0	-	0.0	0.5	7.3	0.6
19	CHEM	0.2	0.5	0.7	-	0.6	0.2	0.5	0.0	0.1	0.0	0.6	0.5	0.6	0.2	0.1	1.9	0.1	0.2	5.9	1.8	0.0	-	0.4	0.6	0.1	0.0	-	0.0	0.4	2.3	0.1
20	RBPL	0.0	0.0	0.0	-	0.0	0.0	0.1	0.0	0.0	0.0	0.9	0.7	1.3	0.1	0.0	0.2	0.0	0.3	0.1	0.4	0.0	-	0.1	0.3	0.0	0.0	-	0.0	0.8	1.3	0.1
21	NMMP	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.5	-	0.1	0.5	0.0	0.0	-	0.0	4.1	0.3	0.0
22	BASM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23	FABM	0.0	0.0	0.1	-	0.1	0.1	1.1	0.0	0.0	0.0	0.7	0.5	1.2	3.0	0.1	0.4	0.0	0.2	0.1	0.2	0.1	-	4.8	5.7	0.2	0.0	-	0.0	3.3	4.1	0.6
24	MAEQ	0.0	0.0	0.1	-	0.4	0.0	9.7	0.0	0.2	0.0	0.2	0.1	0.3	0.3	0.1	0.1	0.0	0.2	0.1	0.0	0.0	-	0.3	4.5	0.0	0.0	-	0.0	3.6	3.4	0.4
25	OMFG	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.1	0.1	0.0	-	0.0	0.4	0.3	0.2
26	ELEC	0.0	0.0	0.0	-	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.1	-	0.0	0.0	0.2	0.1
27	WATS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	WAST	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	-	0.0	0.1	0.0	0.0	-	2.0	0.3	0.0	0.0
29	CONS	0.0	0.1	0.1	-	0.1	0.1	1.7	0.0	0.8	0.1	0.1	0.0	0.1	0.2	0.1	0.2	0.0	0.0	0.0	0.0	0.2	-	0.2	2.1	0.0	0.3	-	0.2	61.1	1.0	0.0
30	TRDE	0.2	0.4	0.6	-	0.9	0.3	8.6	0.0	0.2	0.0	3.5	2.6	8.2	3.2	1.3	1.5	0.1	1.3	0.6	0.2	0.1	-	1.1	4.0	0.2	0.0	-	0.3	8.6	24.9	7.1
31	ACCR	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.1	0.0	0.0	-	0.0	0.2	0.8	0.2
32	RDFR	0.1	0.1	0.1	-	0.2	1.1	2.1	0.0	0.0	0.0	3.6	3.7	4.5	1.1	0.3	1.7	0.1	0.7	1.2	0.3	0.3	-	0.4	0.8	0.1	0.0	-	0.1	0.7	10.3	0.0
33	RDPS	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.1	0.0
34	RFRT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	WFRT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	OFRT	0.0	0.0	0.0	-	0.0	0.0	0.1	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.2	-
37	OTTR	0.0	0.0	0.0	-	0.1	0.2	6.9	0.0	0.1	0.0	2.6	0.3	2.5	0.4	0.1	0.6	0.1	0.3	0.4	0.1	0.0	-	0.1	0.6	0.1	0.0	-	0.0	0.3	9.0	0.1
38	COMM	0.1	0.1	0.0	-	0.1	0.1	1.1	0.0	0.0	0.0	0.5	0.4	0.7	0.3	0.1	0.3	0.0	0.5	0.1	0.1	0.1	-	0.2	0.7	0.0	0.0	-	0.1	1.3	6.6	0.5
39	FIIN	0.2	0.1	0.1	-	0.4	0.2	8.4	0.0	0.1	0.0	0.7	0.5	1.4	1.5	0.2	0.6	0.0	0.6	0.2	0.2	0.1	-	0.3	0.7	0.1	0.0	-	0.1	1.1	12.3	1.2
40	HOUS	0.0	0.1	0.1	-	0.1	0.0	0.3	0.0	0.0	0.0	0.4	0.3	0.5	0.2	0.1	0.2	0.0	0.3	0.1	0.1	0.0	-	0.2	0.5	0.1	0.0	-	0.0	0.9	9.8	1.0
41	EHOP	0.0	0.0	0.0	-	0.1	0.1	3.1	0.0	0.0	0.0	0.2	0.2	0.5	0.1	0.0	0.2	0.0	0.2	0.1	0.0	0.0	-	0.1	0.2	0.0	0.0	-	0.1	0.3	1.3	0.2
42	SRCS	0.1	0.1	0.0	-	0.3	0.1	3.3	0.0	0.5	0.0	1.6	1.2	1.3	1.5	0.1	0.3	0.1	0.5	0.4	0.2	0.1	-	0.5	1.8	0.0	0.4	-	0.0	2.3	8.2	0.6
43	OBUS	0.2	0.2	0.1	-	0.4	0.4	6.0	0.0	0.2	0.0	2.5	1.9	5.1	4.0	0.6	1.6	0.1	1.9	0.5	0.6	0.2	-	0.8	2.4	0.2	0.1	-	0.2	5.2	30.4	3.5
44	GOVC	0.0	0.0	0.0	-	0.0	0.0	0.6	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	-	0.0	0.1	0.0	0.0	-	0.0	0.2	1.0	0.1
45	GOVL	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	-	0.0	0.0	0.0	-	-	0.1	0.0	0.1	0.0
46	SCHL	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.2	0.0
47	OEDU	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.1	0.1	0.0
48	HOSP	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0
49	OHCS	0.0	0.0	0.1	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.3	0.0
50	CULT	0.0	0.0	0.0	-	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.7	0.4	0.0	0.1	0.0	0.4	0.0	0.1	0.0	-	0.1	0.2	0.0	0.0	-	0.0	0.1	3.3	0.4
51	PERS	0.0	0.0	0.0	-	0.1	0.0	1.1	0.0	0.0	0.0	1.5	1.1	0.3	0.3	0.1	0.0	0.0	0.4	0.0	0.0	0.0	-	0.1	0.1	0.0	0.0	-	0.0	0.4	1.1	0.1
	Other Imports	0.4	0.8	0.5	-	1.1	0.5	36.7	0.0	-	0.0	7.0	6.3	25.9	8.2	4.2	2.9	0.4	9.1	4.4	4.8	0.8	-	5.7	15.5	1.2	0.0	-	0.1	57.8	27.4	4.9
	Compensation of Employees	1.3	0.3	1.9	-	6.1	3.4	53.1	-	1.2	-	2.6	0.3	44.9	1.1	4.0	16.9	0.3	12.5	2.3	2.4	1.7	-	9.9	21.5	2.4	0.3	-	1.2	65.4	140.9	28.5
	Depreciation + Op Surplus	1.1	1.0	1.2	-	4.0	-0.3	8.4	0.2	8.5	0.3	27.0	45.1	-1.5	16.0	3.4	0.4	0.9	8.0	4.4	2.6	1.8	-	2.3	11.9	0.5	1.3	-	4.9	17.1	41.6	15.0
	Net Indirect Taxes	0.2	0.8	0.2	-	0.2	-0.0	-0.1	0.0	5.6	0.0	1.4	1.5	-0.1	36.8	0.1	0.0	0.0	0.4	0.1	0.2	0.1	-	0.1	0.2	0.0	0.0	-	0.2	1.5	2.9	2.1
	Domestic Import	1.0	2.4	1.9	-	3.4	2.5	25.0	0.1	7.5	0.2	107.3	133.5	20.3	13.1	4.2	12.1	1.1	7.3	4.1	2.6	2.4	-	8.2	13.2	1.0	2.4	-	2.2	20.4	61.6	23.3
	Gross Output	**5.3**	**7.5**	**8.5**	**-**	**20.4**	**10.5**	**220.4**	**0.5**	**31.2**	**0.8**	**174.0**	**218.9**	**158.4**	**97.1**	**20.9**	**58.3**	**3.8**	**50.5**	**26.9**	**17.4**	**9.1**	**-**	**36.5**	**89.8**	**7.5**	**5.3**	**-**	**11.9**	**274.0**	**424.1**	**101.8**

Table B.11: 2009 I-O table of Nelson (Million NZD) – Continuation (right hand side)

32 RDFR	33 RDPS	34 RFRT	35 WFRT	36 OFRT	37 OTTR	38 COMM	39 FIIN	40 HOUS	41 EHOP	42 SRCS	43 OBUS	44 GOVC	45 GOVL	46 SCHL	47 OEDU	48 HOSP	49 OHCS	50 CULT	51 PERS	Private Consumption	Government Consumption	Stock Change	Gross Investment	Exports	Import Adjustments	Final Demand	Gross Output
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	5.0	0.1	-0.0	0.0	2.3	-0.0	-4.2	**5.3**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.3	-0.0	4.3	**7.5**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	-	-7.9	**8.5**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.8	0.1	-	-	-	-	-1.9	**-**
0.0	0.0	-	-	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.6	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.3	0.1	0.0	1.8	0.6	-0.0	12.3	**20.4**
0.1	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.9	0.1	2.4	-0.0	-4.5	**10.5**
0.0	0.0	-	-	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.1	33.8	-0.0	145.0	**220.4**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.0	-	0.0	0.1	-	0.3	**0.5**
1.5	0.3	-	-	0.1	2.8	0.1	0.0	0.1	0.1	0.3	0.2	0.7	0.2	0.0	0.1	0.3	0.5	0.0	0.1	18.8	0.4	-0.1	3.5	7.8	-16.2	-13.7	**31.2**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.0	0.0	0.0	0.2	-0.0	0.6	**0.8**
-	-	-	-	0.0	0.0	-	-	-	-	-	-	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	26.4	0.6	-	0.1	96.6	-0.0	47.1	**174.0**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	14.2	0.2	-3.4	0.2	190.1	-	17.3	**218.9**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.9	0.1	0.1	0.0	29.7	0.2	-0.1	0.4	56.7	-0.0	22.3	**158.4**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.2	0.6	0.3	0.1	25.4	-0.0	34.4	**97.1**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.1	0.3	0.1	9.1	-0.0	1.8	**20.9**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.3	0.0	0.8	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.3	0.4	0.1	0.4	0.5	19.4	-0.0	12.8	**58.3**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.1	0.0	0.0	1.5	-0.0	-2.6	**3.8**
0.1	0.1	-	-	0.0	0.6	0.7	0.8	0.5	0.2	0.9	5.2	0.6	0.1	0.2	0.4	0.3	0.8	0.4	1.2	5.7	0.1	0.2	0.3	3.8	-0.0	11.7	**50.5**
0.3	0.0	-	-	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.1	0.5	0.5	0.0	0.2	1.1	0.0	0.0	0.0	3.6	-0.0	1.2	**26.9**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.2	6.5	1.3	0.0	0.4	3.5	-0.0	-2.7	**17.4**
0.1	0.0	-	-	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.1	0.6	-0.0	1.0	**9.1**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.0	-	-	-	-	-0.3	**-**
0.0	0.0	-	-	0.0	0.3	0.1	0.1	1.4	0.1	0.3	0.1	0.2	0.1	0.0	0.1	0.1	0.0	0.0	0.0	1.5	0.0	0.3	1.5	3.7	-0.0	-0.1	**36.5**
0.2	0.2	-	-	0.1	2.6	1.1	0.1	0.3	0.3	0.4	0.7	1.0	0.4	0.2	0.7	1.0	0.1	0.3	0.2	9.7	0.0	0.7	19.2	28.6	-0.5	-2.1	**89.8**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6	0.1	0.2	1.9	1.6	-0.0	-3.9	**7.5**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.1	0.5	0.0	0.1	0.0	-	-24.7	**5.3**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	-	-	-	-	-0.0	**-**
0.0	0.0	-	-	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.3	0.5	0.0	0.0	0.2	0.4	0.0	0.5	0.1	0.0	0.0	0.0	0.0	-	6.4	**11.9**
0.2	0.1	-	-	0.0	0.7	0.9	0.5	21.7	0.1	0.4	0.3	4.5	7.2	0.3	2.0	0.8	2.5	0.9	1.3	2.4	0.1	0.1	154.5	1.7	-0.0	2.1	**274.0**
4.2	1.2	-	-	0.1	2.6	1.2	1.0	4.2	0.9	1.0	4.3	2.0	0.4	0.6	0.8	3.4	2.2	0.4	0.1	214.2	7.1	5.2	39.7	86.4	-0.0	-38.8	**424.1**
0.1	0.0	-	-	0.0	0.6	0.0	0.1	0.0	0.0	0.2	0.3	1.4	0.1	0.3	0.6	0.5	1.6	0.2	0.3	49.4	0.8	0.1	0.1	29.0	-0.0	14.4	**101.8**
14.1	0.1	-	-	0.0	1.3	0.4	0.1	0.0	0.2	0.2	0.7	0.3	0.1	0.0	0.1	0.1	0.2	0.1	0.5	2.0	0.4	0.0	0.2	1.0	-	12.7	**68.5**
0.1	0.1	-	-	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.2	0.1	0.1	4.0	2.2	0.0	0.1	1.6	-	1.5	**10.9**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.9	0.1	-	-	-	-	-2.0	**-**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.9	0.1	-	-	-	-	-1.0	**-**
0.0	-	-	-	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.1	0.0	0.0	0.8	-0.0	-1.1	**2.3**
1.6	0.1	-	-	0.4	18.2	0.7	0.5	0.1	0.4	1.4	2.7	1.4	0.1	0.0	0.4	0.2	0.4	0.4	0.5	11.3	0.3	0.0	1.1	35.3	-0.1	1.1	**103.4**
2.2	0.2	-	-	0.0	1.0	10.2	1.5	0.3	0.3	1.8	3.3	1.8	0.5	0.1	0.8	0.7	1.4	0.8	1.1	27.0	0.7	-0.0	1.7	4.9	-0.0	-4.1	**72.1**
0.9	0.3	-	-	0.1	3.3	0.7	19.6	7.2	1.2	1.9	4.9	2.5	0.5	0.1	0.8	1.1	3.0	1.2	2.6	39.3	0.9	0.0	1.4	3.1	-0.0	2.6	**130.2**
0.5	0.1	-	-	0.0	0.9	0.4	1.2	13.6	0.3	1.0	2.5	2.4	0.1	0.1	0.4	0.3	2.5	1.0	0.9	224.2	5.8	0.0	13.3	3.0	-0.0	11.9	**301.9**
0.6	0.2	-	-	0.1	5.1	0.1	0.3	0.3	1.3	0.7	1.0	0.7	0.5	0.0	0.3	0.4	0.6	0.3	0.5	1.8	0.5	0.0	0.4	4.0	-0.0	1.0	**27.6**
0.1	0.1	-	-	0.0	1.2	1.1	4.6	0.2	0.4	12.6	5.2	3.6	1.8	0.1	0.3	1.4	2.2	1.3	1.2	1.9	5.5	0.0	13.7	3.8	-0.0	9.4	**97.3**
1.2	0.5	-	-	0.1	3.6	3.4	6.1	2.8	1.7	6.0	19.5	6.8	1.5	0.7	2.5	3.3	7.2	3.5	6.9	6.4	2.5	0.0	2.9	6.7	-0.0	24.2	**189.2**
0.1	0.0	-	-	0.0	0.2	0.1	0.3	0.3	0.1	0.2	0.4	0.6	0.0	0.2	0.1	0.3	0.6	0.1	0.2	2.9	113.9	-0.0	0.6	1.0	-	-20.6	**104.4**
0.1	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.1	0.4	0.2	0.0	0.1	0.1	0.8	0.1	2.3	46.8	-	0.1	0.6	-	-13.3	**39.5**
0.0	0.0	-	-	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.2	0.2	0.0	0.1	0.2	0.1	0.1	0.1	0.2	1.8	40.8	0.0	0.0	1.3	-	-0.1	**46.3**
0.0	0.0	-	-	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.6	0.3	0.0	0.1	0.6	0.1	0.4	0.0	0.6	14.8	22.0	0.0	0.4	9.8	-0.0	-0.9	**49.7**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	7.2	65.6	0.0	0.2	0.4	-	53.4	**127.4**
0.0	0.0	-	-	0.0	0.1	0.0	0.1	0.1	0.0	0.2	0.2	0.7	0.1	0.1	0.1	3.3	14.3	0.3	0.1	32.9	44.1	0.0	0.5	1.3	-0.0	57.6	**157.1**
0.1	0.0	-	-	0.0	0.4	0.8	0.3	0.1	0.2	0.3	5.5	0.3	0.5	0.3	0.2	0.1	0.3	4.3	0.6	50.8	3.9	0.0	0.3	4.8	-0.0	-28.4	**52.3**
0.3	0.0	-	-	0.0	0.1	0.1	0.2	0.9	0.0	0.3	1.9	0.5	1.1	0.2	0.3	1.1	1.1	0.4	4.5	34.3	1.1	0.0	0.2	1.9	-0.0	16.8	**74.4**
1.6	1.0	-	-	0.2	8.1	3.5	1.3	4.8	2.3	4.1	10.9	4.3	0.7	1.4	2.2	10.7	8.5	4.6	5.1	184.5	3.9	3.8	83.8	-	17.1	-	**594.7**
13.0	2.3	-	-	0.5	53.7	10.7	24.6	8.0	2.9	40.8	49.4	51.7	12.2	40.8	26.3	89.6	61.7	14.4	30.2	-	-	-	-	-	-	-	**959.2**
10.3	5.8	-	-	0.3	-17.2	29.2	34.8	183.1	10.5	12.1	44.0	5.4	6.2	-1.8	4.5	-0.6	32.7	8.8	5.9	-	-	-	-	-	-	-	**600.8**
7.2	-3.1	-	-	0.0	-1.7	0.6	9.0	34.5	0.8	0.4	0.7	1.2	0.2	-0.1	0.6	-0.0	0.3	1.5	0.5	112.3	8.4	0.0	10.0	10.0	-	-	**248.1**
7.6	1.4	-	-	0.3	13.5	6.0	22.7	15.3	2.9	8.5	21.1	8.6	3.9	1.6	4.0	6.4	9.8	5.9	7.3	-	-	-	-	-	-	-348.7	**282.2**
68.5	**10.9**	**-**	**-**	**2.3**	**103.4**	**72.1**	**130.2**	**301.9**	**27.6**	**97.3**	**189.2**	**104.4**	**39.5**	**46.3**	**49.7**	**127.4**	**157.1**	**52.3**	**74.4**	**1,231.7**	**382.4**	**10.9**	**356.0**	**703.9**	**-**	**-**	**6,430.5**

B.12. Marlborough Regional Table

Table B.12: 2009 I-O table of Marlborough (Million NZD)

Industries		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
		HFRG	SBLC	DAIF	OTHF	SAHF	FOLO	FISH	COAL	FUEL	OMIN	MEAT	DAIR	OFOD	BEVT	TCFL	WOOD	PAPR	PPRM	CHEM	RBPL	NMMP	BASM	FABM	MAEQ	OMFG	ELEC	WATS	WAST	CONS	TRDE	ACCR
1	HFRG	2.0	2.0	6.0	0.1	0.4	0.6	0.0	0.0	0.0	0.0	4.3	-	5.7	4.9	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	0.9	1.9
2	SBLC	2.7	28.3	11.4	0.8	0.8	0.6	0.0	0.0	0.0	0.0	116.4	-	3.2	1.4	0.3	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	3.8	0.2
3	DAIF	0.5	2.0	1.8	0.1	0.1	0.0	0.0	0.0	0.0	0.0	-	97.9	0.4	0.3	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	0.2	0.1
4	OTHF	2.3	3.0	2.4	0.8	0.6	0.1	0.0	0.0	0.0	0.0	14.4	1.0	1.3	0.4	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	0.2	0.1
5	SAHF	12.1	10.8	7.5	0.6	2.6	6.3	0.1	0.0	0.0	0.0	7.8	-	0.5	0.1	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.1	0.0	0.0	-	0.0	0.1	0.3	0.0
6	FOLO	0.5	0.9	1.6	0.1	0.0	19.0	0.1	0.0	0.0	0.0	1.5	-	0.0	0.2	0.0	6.7	-	0.0	0.0	0.0	0.0	-	0.0	0.1	0.0	0.0	-	0.0	0.5	1.1	0.0
7	FISH	0.0	0.0	0.0	0.0	0.0	0.0	15.5	0.0	0.0	0.0	0.0	-	20.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.3	0.0
8	COAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	FUEL	0.5	1.1	1.1	0.2	0.6	1.4	2.0	0.1	6.2	0.2	0.7	0.8	1.4	0.4	0.0	0.2	-	0.9	1.3	0.1	0.1	-	0.2	0.5	0.1	5.9	-	0.0	1.5	1.4	0.1
10	OMIN	0.6	1.1	1.5	0.1	0.0	0.1	0.1	0.1	0.6	0.3	-	-	-	-	-	-	-	-	0.0	0.1	1.4	-	0.2	0.0	0.1	-	-	0.0	1.3	0.1	-
11	MEAT	0.1	0.2	1.0	0.1	0.0	0.0	0.2	0.0	0.0	0.0	6.9	-	0.6	-	0.2	-	-	0.2	-	0.1	-	-	-	-	-	-	-	-	-	0.0	2.4
12	DAIR	-	-	-	-	-	-	-	-	0.0	-	-	0.1	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0
13	OFOD	0.5	1.3	5.3	0.4	0.1	0.1	6.2	0.0	0.0	0.0	1.8	1.3	38.2	3.6	0.0	0.1	-	0.2	0.0	0.1	0.0	-	0.0	0.1	0.0	0.0	-	0.0	0.0	1.5	4.8
14	BEVT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	2.9	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.3	5.7
15	TCFL	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	-	0.1	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.1	0.4	0.0
16	WOOD	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	1.6	-	0.0	0.0	0.0	0.1	-	0.1	0.1	0.8	0.0	-	0.0	6.4	0.2	0.0
17	PAPR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	PPRM	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.7	0.6	2.0	1.2	0.0	0.2	-	2.6	0.1	0.2	0.1	-	0.3	0.6	0.1	0.3	-	0.0	0.6	4.9	0.4
19	CHEM	2.0	3.5	5.7	0.3	0.4	0.6	0.1	0.0	0.0	0.0	0.3	0.2	0.3	0.1	0.0	0.3	-	0.1	2.0	0.7	0.0	-	0.2	0.3	0.0	0.0	-	0.0	0.1	0.5	0.0
20	RBPL	1.4	0.9	1.6	0.1	0.1	0.3	0.1	0.0	0.0	0.0	1.9	1.4	2.7	0.3	0.0	0.1	-	0.4	0.1	0.6	0.0	-	0.2	0.6	0.1	0.0	-	0.0	1.2	1.1	0.1
21	NMMP	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.9	0.0	0.0	-	0.0	0.0	0.0	1.5	-	0.1	1.0	0.0	0.0	-	0.0	6.3	0.3	0.0
22	BASM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23	FABM	0.9	1.2	1.6	0.1	0.2	0.7	0.8	0.0	0.1	0.0	1.3	1.0	2.4	6.1	0.0	0.3	-	0.2	0.2	0.3	0.3	-	7.9	10.4	0.5	0.4	-	0.0	4.8	3.4	0.5
24	MAEQ	0.6	1.0	1.7	0.1	1.0	0.3	7.7	0.0	0.4	0.0	0.4	0.3	0.8	0.7	0.0	0.1	-	0.2	0.1	0.1	0.1	-	0.5	8.9	0.1	2.1	-	0.0	5.7	3.1	0.4
25	OMFG	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.1	0.2	0.3	0.0	-	0.0	0.6	0.2	0.1
26	ELEC	4.3	1.2	3.3	0.3	0.1	0.3	0.8	0.0	0.2	0.1	4.0	2.1	2.6	0.6	0.0	0.7	-	0.3	0.4	0.2	0.4	-	0.3	0.8	0.1	100.4	-	0.0	0.6	3.1	1.8
27	WATS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	WAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.0	0.0	0.1	-	0.0	0.0	0.0	0.0	-	0.0	0.1	0.0	0.0	-	0.8	0.2	0.0	0.0
29	CONS	1.4	2.0	2.8	0.2	0.1	0.8	1.0	0.2	1.1	0.3	0.1	0.1	0.1	0.3	0.0	0.1	-	0.0	0.0	0.0	0.4	-	0.2	3.0	0.0	14.2	-	0.1	71.7	0.7	0.0
30	TRDE	5.3	7.4	11.5	0.7	1.4	2.3	4.0	0.0	0.2	0.1	4.5	3.3	10.6	4.1	0.3	0.6	-	0.9	0.5	0.2	0.2	-	1.1	4.6	0.3	1.0	-	0.1	8.0	13.2	4.0
31	ACCR	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.1	0.0	0.1	-	0.0	0.3	0.5	0.1
32	RDFR	3.0	2.4	1.2	0.3	0.5	10.2	1.2	0.0	0.1	0.1	5.8	5.9	7.2	1.7	0.1	0.9	-	0.7	1.3	0.3	0.6	-	0.5	1.2	0.2	0.1	-	0.0	0.8	6.8	0.0
33	RDPS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0
34	RFRT	0.2	0.2	0.2	0.0	-	0.8	-	0.1	-	0.1	1.3	0.5	0.8	0.2	0.0	0.1	-	0.1	0.3	0.1	0.1	-	0.1	0.2	0.0	-	-	-	0.0	0.2	-
35	WFRT	-	-	-	-	-	0.2	0.3	0.0	0.3	0.1	1.4	-	0.4	0.2	-	0.1	-	-	0.1	-	0.2	-	0.0	0.0	-	-	-	0.0	0.0	-	0.1
36	OFRT	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	-	0.2	0.0	0.2	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.2	-
37	OTTR	0.7	0.5	0.4	0.1	0.3	1.7	3.9	0.0	0.2	0.0	4.1	0.5	3.9	0.6	0.0	0.3	-	0.3	0.4	0.2	0.1	-	0.2	0.9	0.1	0.2	-	0.0	0.3	5.8	0.0
38	COMM	0.8	0.7	0.5	0.2	0.1	0.3	0.3	0.0	0.0	0.0	0.4	0.3	0.5	0.2	0.0	0.1	-	0.2	0.1	0.1	0.1	-	0.1	0.5	0.0	0.3	-	0.0	0.7	2.0	0.2
39	FIIN	4.2	2.6	1.5	0.4	0.7	1.3	3.9	0.0	0.1	0.0	0.9	0.7	1.8	2.0	0.0	0.3	-	0.4	0.2	0.2	0.1	-	0.3	0.8	0.1	1.4	-	0.0	1.0	6.5	0.7
40	HOUS	1.8	1.7	2.6	0.0	0.1	0.2	0.2	0.0	0.0	0.0	0.7	0.5	0.9	0.4	0.0	0.1	-	0.3	0.1	0.1	0.1	-	0.3	0.7	0.1	1.3	-	0.0	1.1	6.9	0.7
41	EHOP	1.5	0.8	0.6	0.1	0.3	0.7	2.3	0.0	0.0	0.0	0.4	0.3	1.1	0.2	0.0	0.1	-	0.2	0.1	0.1	0.0	-	0.1	0.4	0.0	0.7	-	0.0	0.4	1.1	0.1
42	SRCS	0.6	0.5	0.3	0.0	0.2	0.3	0.6	0.0	0.2	0.0	0.8	0.6	0.7	0.7	0.0	0.0	-	0.2	0.1	0.1	0.1	-	0.2	0.8	0.0	5.1	-	0.0	0.8	1.7	0.1
43	OBUS	3.9	3.6	2.4	0.7	0.6	2.6	2.3	0.0	0.2	0.0	2.7	2.0	5.6	4.3	0.1	0.6	-	1.2	0.3	0.5	0.4	-	0.7	2.4	0.3	2.9	-	0.1	4.0	13.5	1.7
44	GOVC	0.5	0.8	0.7	0.1	0.0	0.2	0.3	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.1	-	0.0	0.0	0.0	0.0	-	0.0	0.1	0.0	0.1	-	0.0	0.2	0.6	0.1
45	GOVL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.0	-	0.0	0.0	0.0	0.3	-	0.0	0.0	0.0	-	-	0.1	0.1	0.1	0.0
46	SCHL	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.1	0.0	0.0	0.0	-	0.0	0.0	0.0	0.1	-	0.0	0.0	0.1	0.0
47	OEDU	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.1	-	0.0	0.0	0.0	0.0
48	HOSP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0
49	OHCS	0.1	0.5	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.1	-	0.0	0.0	0.1	0.0
50	CULT	0.5	0.4	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.4	0.3	0.8	0.5	0.0	0.0	-	0.3	0.0	0.1	0.1	-	0.1	0.2	0.0	0.1	-	0.0	0.1	1.6	0.2
51	PERS	0.1	0.1	0.2	0.0	0.1	0.3	0.4	0.0	0.0	0.0	1.6	1.2	0.3	0.3	0.0	0.0	-	0.2	0.0	0.0	0.0	-	0.1	0.1	0.0	0.5	-	0.0	0.3	0.5	0.0
	Other Imports	14.2	19.0	11.8	1.7	2.1	4.5	21.5	0.0	-	0.1	11.4	10.3	42.3	13.3	1.2	1.5	-	8.6	5.0	6.0	1.8	-	7.6	22.9	2.5	1.5	-	0.0	67.8	18.4	3.5
	Compensation of Employees	99.5	14.6	8.5	3.2	83.2	8.9	12.3	-	0.9	2.5	9.7	0.2	39.2	45.9	1.4	3.7	-	11.4	0.7	2.6	3.0	-	12.6	31.9	3.1	11.7	-	0.9	67.4	108.1	30.9
	Depreciation + Op Surplus	-8.4	21.7	62.8	1.3	-60.8	19.1	23.8	0.7	12.2	-1.0	38.9	73.8	30.3	12.7	0.7	5.4	-	8.0	6.7	3.6	5.2	-	3.6	17.4	2.5	63.4	-	2.4	28.7	15.1	1.4
	Net Indirect Taxes	-1.2	16.9	12.4	0.5	-3.0	0.8	-0.2	0.1	7.9	-0.1	2.1	2.5	1.1	29.2	0.0	0.2	-	0.4	0.2	0.2	0.4	-	0.2	0.4	0.1	1.2	-	0.1	2.5	1.1	0.2
	Domestic Import	28.2	30.5	35.6	3.5	5.4	13.7	16.8	0.3	11.8	0.5	33.3	146.6	27.5	16.8	1.1	6.2	-	8.7	9.5	4.8	3.9	-	10.3	19.9	3.1	33.0	-	1.4	34.9	51.9	9.6
	Gross Output	**188.6**	**186.1**	**212.1**	**17.4**	**38.6**	**99.7**	**129.0**	**2.0**	**42.9**	**3.3**	**283.6**	**356.8**	**258.2**	**158.2**	**6.0**	**31.1**	**-**	**47.7**	**30.2**	**21.8**	**21.1**	**-**	**48.6**	**132.7**	**15.1**	**248.2**	**-**	**6.5**	**321.5**	**284.3**	**72.7**

Table B.12: 2009 I-O table of Marlborough (Million NZD) – Continuation (right hand side)

32 RDFR	33 RDPS	34 RFRT	35 WFRT	36 OFRT	37 OTTR	38 COMM	39 FIIN	40 HOUS	41 EHOP	42 SRCS	43 OBUS	44 GOVC	45 GOVL	46 SCHL	47 OEDU	48 HOSP	49 OHCS	50 CULT	51 PERS	Private Consumption	Government Consumption	Stock Change	Gross Investment	Exports	Import Adjustments	Final Demand	Gross Output
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	4.3	0.1	-0.2	0.6	83.0	-0.0	71.7	**188.6**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.6	0.0	0.0	0.1	8.4	-0.0	6.5	**186.1**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.1	1.1	-	107.1	**212.1**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.1	0.0	0.1	2.5	-0.0	-13.4	**17.4**
0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.6	0.3	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.2	0.1	0.0	3.5	1.1	-0.0	-16.8	**38.6**
0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	8.6	1.1	22.4	-0.0	33.4	**99.7**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.1	19.8	-0.0	71.9	**129.0**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.0	-	0.1	0.3	-	1.5	**2.0**
0.8	0.1	0.2	0.8	0.1	1.4	0.0	0.0	0.1	0.0	0.1	0.1	0.6	0.3	0.0	0.1	0.1	0.2	0.0	0.0	15.9	0.4	-0.1	4.8	10.7	-22.3	-0.8	**42.9**
0.1	0.0	0.3	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.1	0.7	-0.0	-5.5	**3.3**
-	-	-	-	0.0	0.0	-	-	-	-	-	-	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	22.3	0.6	-	0.2	157.5	-0.0	90.9	**283.6**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	12.0	0.2	-5.5	0.3	309.8	-	39.8	**356.8**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.1	0.0	25.1	0.2	-0.2	0.7	92.4	-0.0	73.7	**258.2**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	28.0	0.6	0.5	0.1	41.4	-0.0	78.3	**158.2**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2	0.1	0.1	0.0	2.6	-0.0	-2.3	**6.0**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.1	0.2	0.2	10.3	-0.0	9.8	**31.1**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.1	0.1	-	-	-	-	-3.2	**-**
0.1	0.0	0.1	0.1	0.0	0.4	0.4	0.6	0.4	0.2	0.4	2.2	0.7	0.1	0.1	0.2	0.1	0.4	0.2	0.6	4.8	0.1	0.2	0.3	3.6	-0.0	15.3	**47.7**
0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.9	0.0	0.0	0.0	4.0	-0.0	7.0	**30.2**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.2	0.2	0.0	0.1	5.5	1.3	0.0	0.5	4.4	-0.0	-6.2	**21.8**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.2	1.5	-0.0	7.6	**21.1**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.0	-	-	-	-	-0.3	**-**
0.0	0.0	0.1	0.1	0.0	0.2	0.0	0.1	1.5	0.1	0.1	0.1	0.3	0.2	0.0	0.1	0.1	0.0	0.0	0.0	1.2	0.0	0.4	2.0	4.9	-0.0	-8.5	**48.6**
0.2	0.2	0.8	0.6	0.2	2.3	0.8	0.1	0.3	0.4	0.3	0.4	1.6	1.1	0.2	0.5	0.6	0.1	0.2	0.2	8.2	0.0	1.0	28.4	42.3	-0.7	6.2	**132.7**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	0.1	0.4	3.9	3.3	-0.0	-0.1	**15.1**
0.0	0.0	0.4	0.0	0.0	0.4	0.2	0.2	0.1	0.1	0.2	0.3	0.9	1.4	0.2	0.6	0.3	0.5	0.2	0.2	23.8	0.5	0.0	6.3	0.6	-	81.5	**248.2**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	-	-	-	-	-0.0	**-**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.7	0.0	0.0	0.1	0.2	0.0	0.2	0.1	0.0	0.0	0.0	0.0	-	2.9	**6.5**
0.1	0.1	0.2	0.1	0.0	0.5	0.5	0.3	18.0	0.1	0.2	0.1	5.4	13.9	0.2	1.1	0.4	1.1	0.5	0.7	2.0	0.1	0.1	181.3	2.0	-0.0	-8.5	**321.5**
2.1	0.6	0.4	0.3	0.1	1.3	0.5	0.6	2.7	0.7	0.4	1.5	1.9	0.5	0.2	0.3	1.3	0.8	0.2	0.0	180.9	7.1	3.5	26.6	57.9	-0.0	-99.0	**284.3**
0.0	0.0	0.1	0.1	0.0	0.4	0.0	0.1	0.0	0.0	0.1	0.1	1.7	0.1	0.2	0.3	0.3	0.7	0.1	0.2	41.7	0.8	0.0	0.1	20.7	-0.0	2.6	**72.7**
8.9	0.0	0.3	0.2	0.1	0.9	0.2	0.1	0.0	0.2	0.1	0.3	0.3	0.2	0.0	0.0	0.0	0.1	0.1	0.3	1.7	0.4	0.0	0.2	0.6	-	-24.4	**44.0**
0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.1	3.4	2.2	0.0	0.0	1.0	-	-1.0	**7.0**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.6	0.1	-	0.3	-	-	13.1	**20.9**
0.9	0.2	2.5	-	0.0	0.1	0.1	0.0	-	-	-	-	-	-	-	-	-	-	-	-	0.8	0.1	-	0.6	-	-	7.2	**15.9**
0.0	-	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.1	0.0	0.0	1.7	-0.0	-0.1	**4.8**
1.0	0.0	1.5	1.0	0.8	11.4	0.4	0.3	0.1	0.4	0.6	1.1	1.6	0.2	0.0	0.2	0.1	0.2	0.2	0.3	9.5	0.3	0.0	0.7	22.7	-0.1	-13.5	**66.5**
0.6	0.1	0.1	0.1	0.0	0.3	2.4	0.5	0.1	0.1	0.3	0.6	1.0	0.4	0.0	0.2	0.1	0.3	0.2	0.3	22.8	0.7	-0.0	0.9	2.6	-0.0	-5.0	**38.2**
0.4	0.1	0.6	0.4	0.1	1.7	0.3	11.0	4.7	1.0	0.6	1.7	2.3	0.7	0.1	0.3	0.4	1.1	0.5	1.1	33.2	0.9	0.0	1.0	2.2	-0.0	-6.1	**92.3**
0.3	0.1	0.2	0.2	0.0	0.6	0.2	0.9	11.9	0.4	0.5	1.1	3.0	0.2	0.0	0.2	0.1	1.2	0.6	0.5	189.4	5.8	0.0	11.1	2.5	-0.0	-1.7	**250.6**
0.5	0.2	1.4	1.0	0.3	4.1	0.1	0.3	0.3	1.6	0.4	0.5	1.0	1.2	0.0	0.2	0.2	0.4	0.2	0.3	1.5	0.5	0.0	0.4	4.0	-0.0	-4.7	**27.6**
0.0	0.0	0.1	0.1	0.0	0.2	0.2	1.0	0.0	0.1	1.7	0.7	1.3	1.1	0.0	0.0	0.2	0.3	0.2	0.2	1.6	5.5	0.0	5.9	1.6	-0.0	4.3	**41.7**
0.5	0.2	0.5	0.4	0.1	1.5	1.2	2.9	1.5	1.1	1.7	5.5	5.4	1.9	0.3	0.9	1.0	2.2	1.3	2.5	5.4	2.5	0.0	1.3	2.9	-0.0	-23.6	**81.1**
0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.2	0.1	0.1	0.1	0.6	0.1	0.1	0.0	0.1	0.3	0.1	0.1	2.5	113.9	-0.0	0.7	1.2	-	0.4	**125.3**
0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.3	0.2	1.4	0.2	0.0	0.1	0.1	0.8	0.1	1.9	46.8	-	0.2	1.2	-	21.2	**76.0**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.1	1.5	40.8	0.0	0.0	0.7	-	-19.1	**25.6**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.1	12.5	22.0	0.0	0.2	5.4	-0.0	-13.4	**27.5**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.1	65.6	0.0	0.1	0.2	-	-13.4	**59.0**
0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.1	0.1	0.7	0.2	0.0	0.1	1.2	5.1	0.1	0.0	27.8	44.1	0.0	0.2	0.6	-0.0	-10.7	**72.7**
0.0	0.0	0.1	0.0	0.0	0.2	0.3	0.1	0.1	0.1	0.1	1.7	0.3	0.7	0.1	0.1	0.0	0.1	1.8	0.2	42.9	3.9	0.0	0.1	2.7	-0.0	-32.3	**29.9**
0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	0.0	0.1	0.5	0.4	1.4	0.1	0.1	0.3	0.3	0.2	1.6	28.9	1.1	0.0	0.1	1.1	-0.0	-2.9	**40.8**
1.0	0.6	1.6	1.4	0.4	5.2	1.8	0.9	3.9	2.3	1.7	4.7	5.1	1.4	0.8	1.2	4.9	3.9	2.6	2.8	155.8	4.6	4.5	98.7	-	23.3	-	**636.0**
13.1	3.1	4.3	2.3	0.8	22.2	3.9	18.0	9.2	5.1	11.8	36.9	42.9	22.3	27.9	7.4	35.9	27.3	9.4	13.6	-	-	-	-	-	-	-	**935.3**
3.9	0.2	3.7	3.3	0.7	0.2	17.2	24.2	149.9	8.5	10.6	3.4	22.0	13.0	-6.0	8.8	5.2	16.3	4.0	6.0	-	-	-	-	-	-	-	**686.3**
2.7	-0.1	-1.3	-	0.1	0.0	0.4	6.2	28.2	0.6	0.3	0.1	5.0	0.4	-0.4	1.1	0.1	0.2	0.7	0.5	94.8	9.9	0.0	11.8	11.7	-	-	**249.6**
6.0	1.1	2.6	3.1	0.7	9.9	7.0	23.3	15.2	3.7	8.7	14.7	17.6	10.5	1.0	2.8	4.4	8.6	4.9	7.4	-	-	-	-	-	-	-417.5	**304.6**
44.0	**7.0**	**20.9**	**15.9**	**4.8**	**66.5**	**38.2**	**92.3**	**250.6**	**27.6**	**41.7**	**81.1**	**125.3**	**76.0**	**25.6**	**27.5**	**59.0**	**72.7**	**29.9**	**40.8**	**1,040.4**	**384.6**	**14.7**	**396.4**	**975.7**	**-**	**-**	**7,223.1**

B.13. West Coast Regional Table

Table B.13: 2009 I-O table of the West Coast (Million NZD)

Industries		1 HFRG	2 SBLC	3 DAIF	4 OTHF	5 SAHF	6 FOLO	7 FISH	8 COAL	9 FUEL	10 OMIN	11 MEAT	12 DAIR	13 OFOD	14 BEVT	15 TCFL	16 WOOD	17 PAPR	18 PPRM	19 CHEM	20 RBPL	21 NMMP	22 BASM	23 FABM	24 MAEQ	25 OMFG	26 ELEC	27 WATS	28 WAST	29 CONS	30 TRDE	31 ACCR
1	HFRG	0.0	0.3	0.8	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.2	-	0.3	0.2	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	0.1	0.8
2	SBLC	0.0	6.1	2.5	0.3	0.2	0.2	0.0	0.0	0.0	0.0	10.0	-	0.3	0.1	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	1.0	0.2
3	DAIF	0.0	2.5	2.2	0.2	0.2	0.1	0.0	0.0	0.0	0.0	-	48.3	0.2	0.2	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	0.2	0.2
4	OTHF	0.1	1.6	1.3	0.9	0.4	0.1	0.0	0.0	0.0	0.0	3.1	0.2	0.3	0.1	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	0.1	0.2
5	SAHF	0.2	2.4	1.7	0.3	0.7	1.7	0.0	0.0	0.0	0.0	0.7	-	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
6	FOLO	0.0	0.5	0.9	0.1	0.0	12.5	0.0	0.1	0.0	0.1	0.3	-	0.0	0.0	-	8.8	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.7	0.0
7	FISH	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0	0.0	-	4.3	0.0	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
8	COAL	-	-	0.3	-	-	-	-	0.2	0.5	1.2	0.0	0.2	0.1	0.0	-	0.1	-	0.0	-	0.0	0.5	-	-	-	-	1.0	-	-	-	0.0	0.0
9	FUEL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	OMIN	0.0	0.6	0.8	0.1	0.0	0.0	0.0	4.0	4.7	9.4	-	-	-	-	-	-	-	-	0.0	0.0	3.2	-	0.0	0.0	0.0	-	0.0	0.0	1.3	0.1	-
11	MEAT	0.0	0.3	1.3	0.2	0.0	0.0	0.1	0.4	0.0	0.6	3.6	-	0.3	-	-	-	-	0.1	-	0.0	-	-	-	-	-	-	-	-	-	0.1	10.3
12	DAIR	-	-	-	-	-	-	-	-	0.0	-	-	0.7	0.0	0.0	-	0.1	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	1.0
13	OFOD	0.0	0.3	1.2	0.2	0.0	0.0	0.3	0.0	0.0	0.0	0.2	0.1	3.5	0.3	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	3.6
14	BEVT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	4.8
15	TCFL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0
16	WOOD	0.0	0.0	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	-	5.1	-	0.0	0.0	0.0	0.6	-	0.0	0.1	0.9	0.0	0.0	0.0	15.5	0.3	0.0
17	PAPR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	PPRM	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.1	0.1	0.2	0.1	-	0.1	-	0.3	0.0	0.0	0.1	-	0.0	0.1	0.0	0.0	0.0	0.0	0.3	1.7	0.4
19	CHEM	0.1	2.0	3.2	0.3	0.2	0.4	0.0	0.1	0.4	0.1	0.1	0.1	0.1	0.0	-	0.4	-	0.0	0.2	0.1	0.1	-	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.3	0.0
20	RBPL	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.1
21	NMMP	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.5	1.1	0.8	0.0	0.0	0.0	0.4	-	0.0	-	0.0	0.0	0.0	7.2	-	0.0	0.6	0.0	0.0	0.0	0.0	13.2	0.4	0.0
22	BASM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23	FABM	0.0	0.1	0.2	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.3	-	0.1	-	0.0	0.0	0.0	0.1	-	0.1	0.7	0.1	0.0	0.0	0.0	1.1	0.5	0.2
24	MAEQ	0.0	0.3	0.6	0.1	0.4	0.1	0.6	0.1	2.1	0.2	0.1	0.0	0.1	0.1	-	0.1	-	0.0	0.0	0.0	0.1	-	0.0	1.6	0.0	0.4	0.0	0.0	3.5	1.2	0.4
25	OMFG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.1	0.2	0.0	0.0	0.0	0.8	0.2	0.3
26	ELEC	0.1	0.6	1.6	0.3	0.0	0.2	0.1	0.6	1.5	2.9	0.7	0.4	0.5	0.1	-	0.8	-	0.1	0.0	0.0	0.8	-	0.0	0.2	0.0	25.1	0.2	0.0	0.5	1.8	2.7
27	WATS	-	-	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.1	-	-	-	-	-	-	-	-	-	0.0	-	0.0	0.9	0.0	0.0	0.1	0.0
28	WAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.1	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.4	0.2	0.0	0.0
29	CONS	0.0	1.1	1.5	0.2	0.1	0.5	0.1	5.8	8.3	9.7	0.0	0.0	0.0	0.1	-	0.1	-	0.0	0.0	0.0	1.0	-	0.0	0.9	0.0	4.1	0.0	0.1	71.7	0.5	0.1
30	TRDE	0.2	4.3	6.6	0.8	1.0	1.6	0.5	1.2	1.8	1.9	1.0	0.8	2.4	0.9	-	0.9	-	0.2	0.1	0.0	0.6	-	0.1	1.5	0.2	0.3	-	0.1	8.6	9.4	7.5
31	ACCR	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3
32	RDFR	0.1	1.4	0.7	0.4	0.3	7.7	0.2	1.1	0.6	1.8	1.4	1.4	1.8	0.4	-	1.4	-	0.2	0.2	0.1	1.6	-	0.0	0.4	0.1	0.0	0.0	0.0	0.9	5.2	0.0
33	RDPS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34	RFRT	0.0	0.1	0.1	0.0	-	0.5	-	4.5	-	1.8	0.3	0.1	0.2	0.1	-	0.1	-	0.0	0.0	0.0	0.2	-	0.0	0.1	0.0	-	-	-	0.0	0.1	-
35	WFRT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	OFRT	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	-	0.1	0.0	0.1	0.0	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.3	-
37	OTTR	0.0	0.3	0.2	0.1	0.2	1.1	0.5	0.6	1.3	0.8	0.9	0.1	0.9	0.1	-	0.4	-	0.1	0.0	0.0	0.2	-	0.0	0.3	0.1	0.1	0.0	0.0	0.4	4.0	0.1
38	COMM	0.0	0.4	0.3	0.2	0.1	0.2	0.0	0.1	0.2	0.2	0.1	0.1	0.1	0.1	-	0.1	-	0.1	0.0	0.0	0.1	-	0.0	0.2	0.0	0.1	0.0	0.0	0.8	1.5	0.3
39	FIIN	0.1	1.4	0.9	0.4	0.4	0.9	0.5	0.3	0.8	0.4	0.2	0.1	0.4	0.4	-	0.4	-	0.1	0.0	0.0	0.3	-	0.0	0.2	0.1	0.4	0.0	0.0	1.1	4.5	1.2
40	HOUS	0.0	0.5	0.8	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	-	0.1	-	0.0	0.0	0.0	0.1	-	0.0	0.1	0.0	0.2	0.0	0.0	0.6	2.7	0.8
41	EHOP	0.0	0.2	0.2	0.0	0.1	0.3	0.2	0.3	0.1	0.5	0.0	0.0	0.1	0.0	-	0.1	-	0.0	0.0	0.0	0.1	-	0.0	0.1	0.0	0.1	0.0	0.0	0.2	0.4	0.1
42	SRCS	0.0	0.6	0.4	0.1	0.3	0.5	0.2	0.4	3.8	0.6	0.4	0.3	0.3	0.3	-	0.1	-	0.1	0.0	0.0	0.4	-	0.0	0.5	0.0	3.1	0.0	0.0	1.8	2.4	0.5
43	OBUS	0.1	1.2	0.8	0.5	0.2	1.0	0.2	0.3	0.9	0.5	0.4	0.3	0.7	0.5	-	0.4	-	0.2	0.0	0.1	0.5	-	0.0	0.4	0.1	0.5	0.0	0.0	2.4	5.4	1.8
44	GOVC	0.0	0.4	0.3	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	-	0.2	-	0.0	0.0	0.0	0.1	-	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.1
45	GOVL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	2.3	0.0	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.7	-	0.0	0.0	0.0	-	-	0.1	0.1	0.1	0.0
46	SCHL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
47	OEDU	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.1	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
48	HOSP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	OHCS	0.0	0.3	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
50	CULT	0.0	0.4	0.3	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.2	0.1	0.3	0.2	-	0.1	-	0.1	0.0	0.0	0.3	-	0.0	0.1	0.0	0.1	0.0	0.0	0.2	2.0	0.6
51	PERS	0.0	0.0	0.1	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.4	0.3	0.1	0.1	-	0.0	-	0.1	0.0	0.0	0.0	-	0.0	0.0	0.0	0.2	0.0	0.0	0.3	0.4	0.1
	Other Imports	0.4	10.2	6.3	1.7	1.4	3.0	2.7	0.5	-	2.1	2.4	2.2	9.0	2.8	-	2.0	-	2.0	0.6	1.0	4.2	-	0.5	6.7	1.2	0.4	0.0	0.0	67.8	12.2	6.2
	Compensation of Employees	2.1	4.2	57.6	3.2	4.2	8.1	1.3	27.2	-	33.6	14.0	11.4	3.6	0.9	0.4	6.4	-	3.4	0.3	-	13.7	-	1.4	9.7	2.4	3.1	0.4	0.4	58.2	74.3	37.1
	Depreciation + Op Surplus	0.6	13.6	-10.8	1.5	7.9	10.4	3.2	-1.4	99.6	8.9	-3.1	4.7	11.0	5.4	-0.3	5.6	-	1.2	0.5	1.0	5.4	-	-0.4	4.8	0.4	18.3	1.7	1.5	37.1	7.7	17.5
	Net Indirect Taxes	0.1	10.6	-2.1	0.6	0.4	0.4	-0.0	-0.2	65.0	0.6	-0.2	0.2	0.4	12.4	-0.0	0.2	-	0.1	0.0	0.1	0.4	-	-0.0	0.1	0.0	0.3	0.0	0.1	3.3	0.5	2.5
	Domestic Import	1.3	30.2	29.3	5.3	5.4	12.8	3.3	13.9	142.9	20.6	22.2	3.4	12.7	6.2	-	6.1	-	2.6	1.2	0.9	5.6	-	1.1	9.2	1.3	12.9	0.6	1.0	27.9	43.2	25.2
	Gross Output	**5.8**	**99.5**	**113.3**	**18.3**	**24.7**	**65.6**	**16.1**	**62.2**	**336.5**	**102.1**	**60.3**	**75.8**	**54.9**	**33.6**	**-0.0**	**40.8**	**-**	**11.2**	**3.4**	**3.5**	**48.3**	**-**	**3.0**	**39.0**	**7.5**	**70.9**	**3.9**	**3.8**	**321.5**	**188.7**	**127.3**

Table B.13: 2009 I-O table of the West Coast (Million NZD) – Continuation (right hand side)

32 RDFR	33 RDPS	34 RFRT	35 WFRT	36 OFRT	37 OTTR	38 COMM	39 FIIN	40 HOUS	41 EHOP	42 SRCS	43 OBUS	44 GOVC	45 GOVL	46 SCHL	47 OEDU	48 HOSP	49 OHCS	50 CULT	51 PERS	Private Consumption	Government Consumption	Stock Change	Gross Investment	Exports	Import Adjustments	Final Demand	Gross Output
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.1	4.5	-0.0	73.5	**99.5**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.6	-	58.1	**113.3**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.1	0.0	0.1	2.6	-0.0	6.1	**18.3**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	2.2	0.7	-0.0	13.4	**24.7**
0.1	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	5.6	0.7	14.7	-0.0	18.8	**65.6**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.5	-0.0	6.8	**16.1**
-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	0.2	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.0	-	2.2	10.0	-	45.3	**62.2**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.4	0.3	-1.0	37.7	84.1	-174.8	378.7	**336.5**
0.0	0.0	0.2	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-	-	-	-	0.0	0.0	0.0	1.8	22.3	-1.0	54.5	**102.1**
-	-	-	-	0.0	0.0	-	-	-	-	-	-	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	16.1	0.4	-	0.1	33.5	-0.0	-7.2	**60.3**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	8.7	0.2	-1.2	0.1	65.8	-	-0.5	**75.8**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	18.1	0.1	-0.0	0.2	19.6	-0.0	6.2	**54.9**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.2	0.4	0.1	0.0	8.8	-0.0	-1.2	**33.6**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.1	-	-	-	-	-3.4	**-**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.1	0.3	0.3	13.6	-0.0	2.6	**40.8**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.2	0.1	-	-	-	-	-2.3	**-**
0.0	0.0	0.1	-	0.0	0.1	0.1	0.3	0.1	0.0	0.1	0.7	0.1	0.0	0.1	0.1	0.1	0.2	0.2	0.2	3.5	0.1	0.0	0.1	0.8	-0.0	-0.1	**11.2**
0.0	0.0	0.0	-	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.7	0.0	0.0	0.0	0.4	-0.0	-6.6	**3.4**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.9	0.0	0.1	0.7	-0.0	-3.9	**3.5**
0.1	0.0	0.0	-	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.5	3.3	-0.1	18.8	**48.3**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.0	-	-	-	-	-0.2	**-**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.1	0.3	-0.0	-2.8	**3.0**
0.1	0.1	0.4	-	0.1	0.9	0.3	0.0	0.1	0.1	0.1	0.1	0.3	0.6	0.1	0.3	0.3	0.0	0.2	0.1	5.9	0.0	0.3	8.4	12.4	-0.2	-4.1	**39.0**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	0.1	0.2	1.9	1.6	-0.0	-2.2	**7.5**
0.0	0.0	0.2	-	0.0	0.2	0.1	0.1	0.0	0.0	0.1	0.2	0.2	1.0	0.2	0.6	0.2	0.3	0.2	0.1	17.1	0.4	0.0	1.8	0.2	-	5.7	**70.9**
0.0	0.0	0.0	-	0.0	0.0	-	0.0	1.0	-	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	-	0.1	0.0	-0.0	0.9	**3.9**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	-	2.1	**3.8**
0.1	0.0	0.1	-	0.0	0.3	0.3	0.3	10.0	0.0	0.1	0.1	1.6	11.7	0.2	1.2	0.3	0.9	0.7	0.4	1.4	0.1	0.1	181.3	2.0	-0.0	2.4	**321.5**
1.5	0.4	0.4	-	0.1	0.9	0.3	0.5	1.6	0.3	0.2	0.9	0.6	0.5	0.3	0.4	1.1	0.7	0.2	0.0	130.3	5.1	2.3	17.7	38.5	-0.0	-70.6	**188.7**
0.0	0.0	0.1	-	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.1	0.5	0.1	0.2	0.3	0.2	0.6	0.1	0.1	30.1	0.6	0.1	0.2	36.2	-0.0	55.8	**127.3**
6.8	0.0	0.3	-	0.1	0.7	0.1	0.1	0.0	0.1	0.0	0.2	0.1	0.2	0.0	0.1	0.0	0.1	0.1	0.2	1.2	0.3	0.0	0.1	0.4	-	-11.4	**29.3**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.0	2.5	1.6	0.0	0.0	0.7	-	-0.8	**4.7**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2	0.1	-	0.2	-	-	6.5	**16.3**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	0.1	-	-	-	-	-0.6	**-**
0.0	-	0.1	-	0.1	0.6	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.1	0.0	0.1	2.0	-0.0	0.9	**5.7**
0.7	0.0	1.2	-	1.0	7.8	0.2	0.3	0.1	0.2	0.3	0.7	0.5	0.2	0.0	0.2	0.1	0.1	0.3	0.2	6.9	0.2	0.0	0.5	15.1	-0.1	-5.1	**44.3**
0.5	0.0	0.1	-	0.0	0.2	1.7	0.5	0.1	0.1	0.2	0.4	0.3	0.4	0.0	0.3	0.1	0.3	0.3	0.2	16.4	0.5	-0.0	0.5	1.6	-0.0	-7.2	**22.9**
0.3	0.1	0.5	-	0.1	1.2	0.2	10.4	2.8	0.4	0.4	1.0	0.7	0.6	0.1	0.4	0.3	0.9	0.8	0.7	23.9	0.7	0.0	0.9	2.0	-0.0	17.9	**82.8**
0.1	0.0	0.1	-	0.0	0.2	0.1	0.5	3.9	0.1	0.2	0.4	0.5	0.1	0.0	0.1	0.1	0.6	0.5	0.2	136.4	4.2	0.0	6.1	1.4	-0.0	-23.8	**138.9**
0.2	0.1	0.6	-	0.2	1.5	0.0	0.1	0.1	0.3	0.1	0.2	0.2	0.5	0.0	0.1	0.1	0.2	0.1	0.1	1.1	0.3	0.0	0.2	1.5	-0.0	-0.8	**10.3**
0.0	0.0	0.1	-	0.0	0.4	0.2	1.9	0.1	0.1	2.1	0.9	0.8	1.9	0.0	0.1	0.4	0.5	0.7	0.3	1.2	4.0	0.0	3.4	1.0	-0.0	-13.1	**24.1**
0.2	0.1	0.2	-	0.1	0.6	0.4	1.5	0.5	0.3	0.6	1.9	0.9	1.0	0.2	0.6	0.5	1.1	1.1	0.9	3.9	1.8	0.0	0.7	1.7	-0.0	7.0	**46.8**
0.0	0.0	0.0	-	0.0	0.1	0.0	0.2	0.1	0.0	0.0	0.1	0.2	0.0	0.1	0.0	0.1	0.2	0.1	0.1	1.8	82.5	-0.0	0.2	0.3	-	-51.9	**36.6**
0.1	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	1.2	0.3	0.0	0.0	0.1	1.1	0.1	1.4	33.9	-	0.2	1.0	-	19.5	**63.9**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	1.1	29.6	0.0	0.0	0.8	-	-5.2	**27.6**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.2	0.0	0.1	0.0	0.1	9.0	16.0	0.0	0.2	5.8	-0.0	-2.5	**29.6**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4	47.5	0.0	0.1	0.1	-	-4.8	**47.5**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.1	1.0	4.2	0.2	0.0	20.0	32.0	0.0	0.2	0.5	-0.0	-1.6	**58.6**
0.0	0.0	0.1	-	0.0	0.2	0.3	0.2	0.1	0.1	0.1	1.8	0.2	1.1	0.3	0.2	0.0	0.2	4.5	0.3	30.9	2.8	0.0	0.2	3.8	-0.0	-11.9	**41.1**
0.1	0.0	0.0	-	0.0	0.0	0.0	0.1	0.3	0.0	0.1	0.4	0.2	1.4	0.1	0.1	0.3	0.3	0.3	1.1	20.8	0.8	0.0	0.1	0.6	-0.0	-6.0	**24.0**
0.7	0.4	1.3	-	0.4	3.5	1.1	0.8	2.2	0.9	1.0	2.7	1.5	1.2	0.8	1.3	4.0	3.2	3.6	1.6	112.3	2.8	2.7	60.3	-	176.2	-	**536.0**
13.7	1.6	3.7	-	1.1	12.9	3.6	10.5	3.1	1.5	16.6	15.1	25.2	17.5	24.5	11.6	50.2	19.1	19.9	9.7	-	-	-	-	-	-	-	**643.5**
-0.3	1.2	2.3	-	0.8	1.8	9.1	26.3	84.7	3.6	-3.3	8.1	-3.9	12.1	-1.3	6.3	-16.7	16.0	-0.4	2.0	-	-	-	-	-	-	-	**401.9**
-0.2	-0.6	-0.8	-	0.1	0.2	0.2	6.8	16.0	0.3	-0.1	0.1	-0.9	0.4	-0.1	0.8	-0.3	0.2	-0.1	0.2	68.3	6.1	0.0	7.2	7.2	-	-	**206.5**
4.4	1.0	4.9	-	1.2	9.3	4.4	21.0	10.9	1.9	4.5	9.6	6.1	8.5	1.2	3.7	4.3	8.1	5.9	4.8	-	-	-	-	-	-	-546.8	**17.3**
29.3	**4.7**	**16.3**	**-**	**5.7**	**44.3**	**22.9**	**82.8**	**138.9**	**10.3**	**24.1**	**46.8**	**36.6**	**63.9**	**27.6**	**29.6**	**47.5**	**58.6**	**41.1**	**24.0**	**749.5**	**277.0**	**9.8**	**339.1**	**429.7**	-	-	**4,501.8**
0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.1	4.5	-0.0	73.5	**99.5**

B.14. Canterbury Regional Table

Table B.14: 2009 I-O table of Canterbury (Million NZD)

Industries		1 HFRG	2 SBLC	3 DAIF	4 OTHF	5 SAHF	6 FOLO	7 FISH	8 COAL	9 FUEL	10 OMIN	11 MEAT	12 DAIR	13 OFOD	14 BEVT	15 TCFL	16 WOOD	17 PAPR	18 PPRM	19 CHEM	20 RBPL	21 NMMP	22 BASM	23 FABM	24 MAEQ	25 OMFG	26 ELEC	27 WATS	28 WAST	29 CONS	30 TRDE	31 ACCR
1	HFRG	1.3	6.1	18.0	1.0	1.1	0.6	0.0	0.0	0.0	0.0	9.8	-	13.0	11.2	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.2	8.5	14.9
2	SBLC	3.4	164.8	66.5	15.5	4.0	1.2	0.0	0.0	0.0	0.0	513.7	-	14.3	6.4	15.7	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.2	69.6	3.3
3	DAIF	1.4	26.1	22.8	3.9	1.4	0.2	0.0	0.0	0.0	0.0	-	963.9	3.9	3.3	1.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.1	6.5	1.7
4	OTHF	2.7	16.7	13.4	15.1	2.8	0.2	0.0	0.0	0.0	0.0	60.9	4.1	5.3	1.6	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.1	3.6	1.5
5	SAHF	8.9	37.2	25.8	7.1	7.9	7.8	0.1	0.0	0.0	0.0	20.5	-	1.2	0.4	0.2	0.1	0.0	0.0	0.6	0.2	0.1	0.0	0.0	0.4	0.0	0.1	0.0	0.0	0.5	3.4	0.1
6	FOLO	0.3	2.0	3.5	0.5	0.1	15.0	0.0	0.0	0.0	0.0	2.5	-	0.1	0.3	0.2	32.5	5.0	0.1	0.3	0.0	0.0	0.0	0.1	0.4	0.2	0.0	0.0	0.0	2.0	7.3	0.0
7	FISH	0.0	0.0	0.1	0.0	0.1	0.0	12.3	0.0	0.1	0.0	0.0	-	84.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	5.3	0.2
8	COAL	-	-	2.7	-	-	-	-	0.1	1.2	0.3	0.9	3.1	2.2	0.2	0.4	0.8	0.3	0.1	-	0.4	3.1	14.6	-	-	-	18.8	-	-	-	1.1	0.1
9	FUEL	0.4	4.6	4.5	2.6	2.0	2.0	1.2	0.8	88.1	1.0	2.0	2.4	4.3	1.3	1.5	1.9	1.7	5.6	22.4	2.4	1.4	0.8	1.4	4.7	1.1	22.9	0.0	0.4	11.9	18.2	1.4
10	OMIN	0.3	2.2	3.1	0.6	0.0	0.0	0.0	0.4	4.4	1.0	-	-	-	-	-	-	-	-	0.4	1.1	7.8	2.6	0.7	0.2	0.4	-	0.0	0.2	5.2	0.8	-
11	MEAT	0.3	3.0	13.5	3.5	0.2	0.1	0.4	0.1	0.0	0.2	72.5	-	6.0	-	29.1	-	-	4.6	-	10.4	-	-	-	-	-	-	-	-	-	1.9	84.7
12	DAIR	-	-	-	-	-	-	-	-	0.1	-	-	10.4	0.7	0.4	-	0.8	0.2	0.1	0.3	0.6	0.2	0.0	0.1	0.9	0.3	0.0	0.0	0.0	0.0	16.0	6.2
13	OFOD	0.6	7.3	29.7	7.4	0.6	0.1	4.9	0.0	0.1	0.0	7.7	5.6	161.9	15.1	0.5	0.9	0.5	1.3	0.7	2.4	0.2	0.1	0.5	1.5	0.4	0.0	0.0	0.0	0.3	25.6	69.2
14	BEVT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	8.5	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	3.7	57.6
15	TCFL	0.1	0.2	1.1	0.1	0.2	0.2	0.1	0.0	0.0	0.0	0.2	0.1	0.6	0.5	17.9	0.7	0.2	1.7	0.1	0.5	0.1	0.2	0.4	1.8	0.9	0.0	0.0	0.0	5.4	23.1	0.1
16	WOOD	0.1	0.4	0.6	0.1	0.0	0.7	0.0	0.0	0.0	0.0	0.1	0.1	0.1	1.0	0.1	44.0	3.9	0.8	0.1	0.8	3.6	0.3	1.2	2.4	26.9	0.0	0.0	0.0	157.1	7.6	0.1
17	PAPR	2.3	0.4	0.4	0.7	0.1	0.1	0.0	0.0	0.1	0.0	0.4	0.3	1.0	2.3	0.1	1.6	23.3	12.6	0.4	5.3	1.0	0.1	0.1	1.2	0.7	1.5	0.0	0.0	3.0	14.7	0.7
18	PPRM	0.3	1.5	0.6	0.9	0.9	0.2	0.1	0.0	0.7	0.0	3.2	2.3	8.3	5.1	1.8	2.2	3.9	21.9	1.7	6.7	1.5	0.4	2.8	7.8	2.0	1.7	0.0	0.2	6.5	85.0	5.7
19	CHEM	8.7	71.3	115.3	17.2	6.7	4.2	0.3	0.1	3.1	0.1	4.9	3.5	4.5	1.2	1.2	13.6	8.1	1.6	173.9	84.7	1.9	0.8	5.5	12.9	2.5	0.8	0.2	0.1	5.7	29.6	0.7
20	RBPL	4.2	13.0	22.9	6.3	0.8	1.3	0.2	0.0	0.9	0.1	21.3	15.7	29.6	2.9	1.7	4.4	1.7	7.7	5.7	53.6	0.8	0.5	4.8	18.2	3.5	0.2	0.1	0.2	33.0	50.4	4.7
21	NMMP	0.2	1.5	2.1	0.4	0.1	0.1	0.0	0.1	2.6	0.2	0.1	0.1	1.0	8.2	0.0	0.4	0.1	0.3	0.1	0.8	47.3	0.7	3.0	24.3	1.0	0.0	0.3	0.3	144.7	9.7	0.3
22	BASM	0.0	0.3	0.3	0.1	0.3	0.6	0.0	0.0	0.7	0.0	2.4	1.8	1.9	0.9	0.6	1.7	1.6	1.2	2.0	2.3	2.4	14.5	28.8	38.5	4.5	0.2	0.2	0.0	5.3	36.0	2.1
23	FABM	1.2	7.5	10.2	2.2	0.9	1.5	0.7	0.1	1.5	0.1	6.3	4.7	11.2	28.4	2.2	4.0	3.4	1.9	4.8	10.2	4.4	15.6	84.2	139.0	8.5	2.5	0.1	0.5	58.7	64.9	8.2
24	MAEQ	0.7	5.3	9.4	1.5	5.1	0.7	6.1	0.1	8.6	0.1	1.7	1.3	3.2	3.0	1.4	0.9	1.1	1.9	2.8	2.3	0.8	2.1	5.0	108.2	1.1	11.2	0.1	0.4	63.0	53.6	5.6
25	OMFG	0.0	0.3	0.4	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.3	1.1	0.1	0.2	0.1	0.4	0.1	0.5	0.2	0.3	1.1	3.9	5.5	0.0	0.1	0.0	9.5	5.9	2.8
26	ELEC	5.0	6.6	17.9	5.4	0.3	0.5	0.6	0.2	4.2	0.9	16.5	8.8	10.9	2.6	2.3	8.0	19.1	2.6	10.0	7.2	5.7	25.3	3.2	9.1	1.6	520.3	1.9	0.3	6.1	51.6	24.7
27	WATS	-	-	-	-	0.2	0.0	0.1	0.0	0.0	0.0	2.0	0.6	0.2	0.6	0.1	-	0.0	-	-	-	-	-	-	0.1	-	0.1	5.2	0.0	0.1	2.1	0.2
28	WAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	2.4	1.9	0.0	0.2	2.8	0.0	0.4	1.4	0.4	0.0	0.1	0.0	2.5	0.2	0.2	0.1	27.7	6.4	0.5	0.1
29	CONS	1.7	11.3	15.7	3.5	0.5	1.5	0.8	1.7	20.9	2.8	0.4	0.3	0.6	1.1	0.8	1.4	1.7	0.3	0.4	0.9	6.3	0.3	2.0	36.7	0.7	76.1	0.0	1.5	788.2	11.9	0.5
30	TRDE	7.9	52.5	81.1	16.6	9.0	5.8	4.0	0.4	5.3	0.6	24.0	17.7	56.5	22.0	18.9	9.9	10.0	10.1	15.2	9.0	4.5	12.1	14.0	70.7	6.3	6.7	-	2.1	110.9	291.7	73.2
31	ACCR	0.2	0.6	0.8	0.3	0.2	0.2	0.0	0.0	0.2	0.0	0.2	0.2	0.4	0.3	0.2	0.2	0.1	0.3	0.2	0.5	0.1	0.1	0.3	1.2	0.2	0.3	0.0	0.1	2.9	9.0	2.1
32	RDFR	4.1	15.0	7.8	7.2	2.6	23.3	1.1	0.3	1.5	0.5	28.0	28.8	35.1	8.3	4.7	12.7	5.2	6.4	35.2	13.2	10.7	8.8	5.5	16.9	3.8	0.4	0.1	0.7	9.6	136.0	0.4
33	RDPS	0.0	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.2	0.0	0.1	0.0	0.0	0.6	1.2	0.5
34	RFRT	0.2	0.9	0.7	0.4	-	1.1	-	0.9	-	0.4	4.1	1.5	2.4	0.7	0.7	0.9	1.7	0.9	4.8	1.8	0.9	0.8	0.9	2.0	0.6	-	-	-	0.3	2.3	-
35	WFRT	-	-	-	-	-	0.1	0.1	0.0	1.9	0.3	2.2	-	0.5	0.3	-	0.3	0.9	-	0.4	-	1.2	0.3	0.1	0.2	-	-	0.0	0.1	0.1	-	0.8
36	OFRT	0.1	0.3	0.3	0.2	0.2	0.4	0.4	0.0	0.2	-	2.1	0.3	2.1	0.3	0.3	0.5	0.8	0.3	1.1	0.7	0.1	0.2	0.2	1.4	0.2	0.1	-	-	0.5	13.3	-
37	OTTR	0.8	2.8	2.0	1.7	1.3	3.5	3.2	0.2	3.1	0.2	18.0	2.1	17.0	2.4	2.1	4.1	7.0	2.7	9.4	5.6	1.5	1.7	1.7	11.0	1.7	1.1	0.0	0.1	3.9	105.0	0.5
38	COMM	2.8	10.8	7.3	8.5	1.6	1.6	0.6	0.1	1.1	0.2	4.2	3.1	6.3	2.6	1.8	2.3	1.6	5.2	4.5	7.2	2.2	1.0	3.2	15.3	1.7	3.9	0.0	0.6	21.2	97.3	6.5
39	FIIN	9.8	27.7	16.6	13.1	6.4	5.0	6.0	0.1	3.8	0.2	7.3	5.4	14.8	16.2	3.9	6.1	2.9	6.8	7.9	10.3	3.4	10.2	5.5	18.9	3.0	14.3	0.1	0.7	22.0	219.8	18.8
40	HOUS	2.1	9.3	14.7	0.7	0.7	0.5	0.1	0.0	0.6	0.0	3.0	2.2	3.8	1.5	2.1	1.4	0.4	2.6	1.7	3.8	1.1	0.5	3.3	9.0	2.0	7.1	0.0	0.3	11.9	121.4	10.8
41	EHOP	1.8	4.2	3.6	1.4	1.4	1.4	1.8	0.2	0.6	0.3	1.8	1.3	4.5	0.7	0.5	1.6	0.5	1.8	3.1	1.8	0.7	0.4	1.0	4.9	0.6	3.5	0.2	0.6	4.3	19.8	2.0
42	SRCS	2.5	9.5	6.5	2.0	3.3	2.2	1.6	0.2	15.1	0.3	11.5	8.5	9.7	10.6	1.7	2.1	7.6	4.3	10.8	8.2	4.1	3.6	6.4	34.5	1.6	92.4	0.2	0.3	31.2	101.4	6.2
43	OBUS	7.5	32.2	21.6	21.4	4.4	8.4	3.0	0.2	5.7	0.3	18.6	13.7	37.7	29.2	9.2	10.8	4.2	16.2	12.9	28.8	8.7	3.2	11.3	46.2	6.5	24.4	0.5	1.4	70.8	377.8	38.6
44	GOVC	0.7	5.6	4.6	1.2	0.3	0.6	0.3	0.0	0.1	0.0	0.4	0.3	0.7	0.3	0.2	2.0	0.3	0.4	0.3	0.5	0.5	0.1	0.4	1.2	0.6	0.5	0.0	0.1	3.0	13.3	1.5
45	GOVL	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.3	0.0	0.6	0.2	0.2	0.3	0.2	0.1	0.2	0.0	0.2	0.1	0.1	4.1	0.0	0.1	0.5	0.0	-	-	1.2	0.9	1.2	0.1
46	SCHL	0.1	0.4	0.5	0.2	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.2	0.1	0.1	0.4	0.0	0.7	0.1	0.3	0.0	0.0	0.3	0.5	0.1	0.8	0.0	0.0	0.5	2.1	0.3
47	OEDU	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.2	0.1	0.0	0.9	0.0	0.1	0.1	0.3	0.0	0.0	0.1	0.3	0.0	1.3	0.0	0.0	1.1	1.8	0.2
48	HOSP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.0
49	OHCS	0.2	4.0	10.9	0.5	0.2	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.2	0.5	0.1	0.2	0.3	0.3	0.1	0.3	0.3	0.0	0.2	0.6	0.0	0.3	0.0	0.0	0.6	3.0	0.2
50	CULT	0.9	4.1	2.9	1.7	0.9	0.2	0.0	0.0	0.2	0.0	3.0	2.2	6.1	3.5	0.8	0.8	0.3	4.6	1.1	5.7	1.6	0.2	0.9	5.0	0.7	1.3	0.0	0.1	2.5	49.4	4.9
51	PERS	0.1	0.6	1.7	0.2	0.9	0.8	0.5	0.0	0.1	0.0	10.4	7.7	2.1	1.8	1.6	0.2	0.1	2.9	0.6	1.1	0.2	0.1	0.9	2.5	0.2	4.0	0.0	0.0	4.7	13.2	0.9
	Other Imports	16.9	106.1	65.9	30.6	10.7	9.0	17.0	0.1	-	0.6	48.3	43.8	179.3	56.5	63.7	18.6	26.1	73.0	116.7	207.0	27.6	20.8	73.8	276.8	38.3	8.0	0.3	0.7	745.8	320.5	50.6
	Compensation of Employees	82.3	228.0	242.7	61.8	91.0	23.6	24.0	8.6	5.1	8.6	297.1	56.0	204.9	39.5	88.4	88.3	26.3	118.9	28.3	125.4	72.2	21.5	141.2	517.1	58.8	75.9	4.7	25.0	700.1	1,501.3	295.1
	Depreciation + Op Surplus	21.4	38.7	187.6	22.2	6.5	32.5	4.5	-1.1	246.2	3.5	-78.2	259.5	91.2	100.7	23.0	23.5	61.7	46.1	145.3	92.7	52.0	112.8	16.6	80.8	29.6	326.7	16.3	23.2	353.4	626.5	152.5
	Net Indirect Taxes	3.1	30.2	37.1	8.7	0.3	1.4	-0.0	-0.2	160.6	0.2	-4.2	8.8	3.4	232.2	0.6	0.9	2.2	2.2	4.4	5.9	4.0	1.6	0.9	1.7	1.0	6.1	0.2	1.0	31.3	44.0	21.4
	Domestic Import	14.7	65.8	66.7	23.4	15.1	38.5	6.1	3.5	252.8	5.3	48.5	18.2	41.8	32.9	9.0	67.0	30.6	29.1	72.5	24.1	26.5	25.5	37.7	70.5	13.8	93.5	8.3	2.4	88.7	275.3	62.0
	Gross Output	**224.5**	**1,039.6**	**1,184.6**	**320.0**	**193.8**	**199.4**	**102.1**	**17.7**	**842.1**	**29.1**	**1,203.0**	**1,513.2**	**1,095.1**	**671.0**	**313.8**	**378.9**	**266.9**	**403.7**	**705.1**	**748.4**	**317.2**	**304.9**	**471.1**	**1,604.6**	**233.5**	**1,329.6**	**39.1**	**92.6**	**3,536.1**	**4,966.1**	**1,047.5**

Table B.14: 2009 I-O table of Canterbury (Million NZD) – Continuation (right hand side)

32 RDFR	33 RDPS	34 RFRT	35 WFRT	36 OFRT	37 OTTR	38 COMM	39 FIIN	40 HOUS	41 EHOP	42 SRCS	43 OBUS	44 GOVC	45 GOVL	46 SCHL	47 OEDU	48 HOSP	49 OHCS	50 CULT	51 PERS	Private Consumption	Government Consumption	Stock Change	Gross Investment	Exports	Import Adjustments	Final Demand	Gross Output
0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.7	0.1	0.2	0.4	0.2	0.0	0.0	0.0	2.9	0.1	0.1	0.0	55.6	1.1	-0.3	0.7	98.7	-0.0	-22.5	**224.5**
0.1	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.5	0.6	0.4	0.2	0.3	0.0	0.0	0.0	0.5	0.1	1.5	0.0	8.4	0.2	0.3	0.7	47.2	-0.0	99.5	**1,039.6**
0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	1.3	0.2	0.0	0.1	0.2	0.0	0.0	0.0	0.4	0.1	0.4	0.0	2.1	0.8	0.1	0.7	6.0	-	135.8	**1,184.6**
0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.7	0.8	0.1	0.1	0.4	0.0	0.0	0.0	0.6	0.2	0.8	0.1	20.3	0.9	0.2	1.3	45.2	-0.0	119.1	**320.0**
0.6	0.0	0.1	0.0	0.2	1.1	0.0	0.2	0.1	0.9	0.1	9.7	1.5	0.1	0.0	0.1	0.0	1.0	1.4	0.2	3.1	1.8	0.0	17.4	5.3	-0.0	26.2	**193.8**
0.8	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.1	0.1	0.1	10.4	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	7.5	0.4	17.1	2.1	44.8	-0.0	42.8	**199.4**
0.1	0.0	0.0	0.0	0.1	0.5	0.0	1.2	0.2	0.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.9	0.1	15.7	-0.0	-20.9	**102.1**
-	-	-	0.0	-	0.0	-	-	-	-	-	-	0.2	2.2	0.6	1.2	3.0	0.2	0.1	0.1	1.7	0.1	-	0.6	2.9	-	-45.5	**17.7**
10.4	2.0	0.4	1.2	2.7	18.9	0.6	0.4	0.8	0.4	1.6	1.3	4.0	2.0	0.3	0.9	1.4	2.2	0.3	0.5	206.8	5.2	-2.4	94.4	210.5	-437.4	495.9	**842.1**
0.5	0.0	0.3	-	-	0.0	0.0	0.0	0.1	0.0	0.1	0.1	-	-	-	-	-	-	-	-	0.6	0.3	0.0	0.5	6.3	-0.3	-11.1	**29.1**
-	-	-	-	0.0	0.2	-	-	-	-	-	-	1.1	-	0.1	0.8	0.9	0.1	0.9	0.1	291.1	7.2	-	1.0	667.9	-0.0	1.4	**1,203.0**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.2	-	0.0	0.0	0.1	0.1	0.0	-	0.0	156.8	2.8	-23.3	1.3	1,314.0	-	23.5	**1,513.2**
0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.5	0.2	0.3	0.2	0.7	0.3	0.1	0.1	0.3	7.1	0.6	1.9	0.1	327.0	2.2	-0.8	3.1	391.8	-0.0	14.3	**1,095.1**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.1	0.0	0.0	1.1	0.0	365.2	7.1	2.2	0.4	175.4	-0.0	47.6	**671.0**
0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.1	7.1	0.1	0.1	0.9	1.3	0.2	0.3	0.6	0.4	0.2	0.7	0.0	54.9	0.9	4.0	1.4	136.7	-0.1	47.3	**313.8**
0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	3.2	0.0	8.0	0.6	0.3	0.0	0.4	0.5	0.3	0.0	0.1	2.2	4.7	1.0	2.6	3.0	126.1	-0.0	-26.7	**378.9**
0.3	0.2	0.1	0.0	0.2	1.3	0.1	0.4	8.2	0.0	1.9	16.2	0.1	0.1	0.1	0.3	0.2	1.0	0.0	0.0	40.5	1.0	0.1	0.2	104.9	-0.0	14.8	**266.9**
1.8	0.6	0.4	0.2	1.0	6.9	10.0	13.5	5.5	2.8	10.2	58.4	6.5	0.8	2.6	4.5	2.3	6.2	6.7	9.1	63.1	1.3	1.7	2.4	30.4	-0.2	-20.9	**403.7**
3.5	0.6	0.3	0.2	0.9	5.9	0.2	0.2	0.6	0.6	0.5	2.3	0.8	0.5	0.4	0.7	4.2	4.0	0.4	1.9	12.4	0.2	0.9	0.8	93.5	-0.7	-15.8	**705.1**
0.1	0.5	0.0	0.0	0.1	0.9	0.7	0.7	6.0	0.7	1.9	10.5	1.7	0.7	0.5	1.4	7.3	7.3	0.5	4.4	71.5	16.1	0.4	15.6	152.5	-0.8	136.8	**748.4**
1.9	0.7	0.0	0.0	0.0	0.3	0.4	0.2	3.5	2.6	7.4	0.5	0.1	0.1	0.4	0.3	0.0	0.4	0.0	0.5	6.4	0.2	0.0	3.3	21.9	-0.6	16.6	**317.2**
0.1	0.0	0.0	0.0	0.0	0.2	0.0	1.0	0.2	0.1	3.7	1.4	0.1	0.1	0.3	0.2	0.1	0.3	0.3	0.0	3.6	0.1	0.1	2.6	101.4	-0.1	37.7	**304.9**
0.4	0.2	0.3	0.1	0.7	4.9	1.1	2.1	22.0	1.5	4.0	2.0	3.6	1.6	0.7	1.3	0.9	0.2	0.6	0.2	16.0	0.6	3.8	18.9	47.7	-0.3	-153.7	**471.1**
3.7	3.0	2.2	1.1	6.4	42.9	21.8	1.2	4.3	6.2	6.6	10.6	14.7	9.7	3.1	10.5	10.3	1.5	6.3	2.6	107.3	0.6	11.9	343.2	511.5	-8.5	161.6	**1,604.6**
0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.1	8.7	0.3	0.2	0.3	0.3	0.5	0.3	0.2	0.1	0.2	0.2	0.6	62.0	1.2	6.2	60.2	50.7	-0.0	7.5	**233.5**
0.9	0.4	1.0	0.0	1.0	7.0	6.1	3.7	0.8	1.1	6.3	8.5	7.7	11.6	3.7	12.4	5.1	7.4	5.3	2.4	309.9	6.3	0.0	34.0	3.3	-	104.4	**1,329.6**
0.0	0.0	0.0	0.0	0.0	0.1	-	0.0	14.0	-	0.0	0.0	0.1	2.3	0.0	0.0	0.1	0.1	0.0	-	0.2	0.1	-	1.0	0.0	-0.0	9.3	**39.1**
0.1	0.0	0.0	0.0	0.0	0.1	0.1	2.4	0.5	0.0	0.0	1.2	5.1	13.7	0.8	0.5	2.9	6.2	0.0	7.8	1.5	0.1	0.0	0.1	0.0	-	0.1	**92.6**
2.0	1.4	0.4	0.2	1.3	8.5	12.9	7.6	245.9	1.5	4.1	3.5	49.7	118.6	3.6	23.1	6.4	18.9	13.6	10.4	26.0	1.0	0.7	1,994.1	22.5	-0.0	-34.0	**3,536.1**
50.9	15.0	1.6	0.9	4.7	31.8	17.0	16.1	47.2	13.3	11.8	49.1	21.7	5.9	6.5	9.0	26.3	16.7	5.7	0.7	2,359.5	88.1	60.5	465.4	1,011.8	-0.4	-339.4	**4,966.1**
0.6	0.1	0.4	0.2	1.1	7.5	0.3	1.6	0.5	0.4	2.0	3.3	16.1	1.3	3.7	6.3	4.2	12.1	2.7	2.5	544.3	10.5	0.6	1.4	297.9	-0.0	104.4	**1,047.5**
193.4	1.1	0.9	0.5	2.7	18.5	6.0	1.8	0.4	3.0	2.2	9.6	3.4	2.1	0.4	1.0	0.5	1.8	2.6	4.1	22.4	4.8	0.0	2.9	12.0	-	102.0	**834.1**
1.9	1.7	0.1	0.0	0.2	1.6	0.1	1.1	0.0	0.3	2.5	3.1	1.5	0.1	2.1	2.5	0.8	3.1	1.7	2.1	44.4	27.3	0.1	0.7	19.2	-	10.1	**132.5**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21.4	1.2	-	0.9	-	-	5.2	**60.4**
5.9	1.1	2.6	-	0.1	0.7	1.0	0.2	-	-	-	-	-	-	-	-	-	-	-	-	10.0	1.0	-	1.3	-	-	-1.9	**31.7**
1.9	-	0.3	0.3	4.2	28.1	1.2	1.0	0.2	0.7	2.0	3.9	1.9	0.3	0.1	0.5	0.2	0.4	0.8	0.5	15.4	1.2	0.1	1.9	64.7	-0.2	28.9	**186.7**
18.9	0.7	4.4	2.0	33.4	222.1	10.3	8.1	1.3	5.9	15.6	30.8	15.2	2.2	0.6	4.0	1.4	2.8	6.3	4.0	124.2	3.2	0.5	13.4	429.8	-1.4	82.6	**1,259.7**
34.3	2.8	0.8	0.4	2.3	15.3	187.4	30.2	4.7	4.7	25.5	46.6	24.6	9.6	1.9	12.2	6.4	13.6	15.5	10.6	296.9	8.4	-0.1	24.2	71.4	-0.1	-22.8	**1,053.8**
16.3	5.1	3.1	1.6	9.0	60.7	14.9	479.2	125.4	26.4	32.5	85.1	42.0	11.6	2.4	13.7	13.2	35.0	27.7	31.0	433.3	11.4	0.1	21.9	49.6	-0.2	41.4	**2,080.6**
6.5	1.1	0.6	0.3	1.8	11.9	6.5	20.5	162.6	5.0	12.2	30.3	27.8	1.8	0.8	4.3	2.3	20.5	16.1	7.4	2,469.8	71.6	0.0	151.0	33.8	-0.0	134.7	**3,419.9**
8.7	3.5	4.0	2.0	11.6	78.2	2.2	6.3	4.0	22.8	9.5	13.7	9.3	9.9	0.3	3.6	3.7	6.2	5.0	4.5	19.7	5.9	0.3	6.3	55.6	-0.1	19.0	**388.1**
1.1	1.4	0.8	0.4	2.4	15.8	17.2	76.8	2.2	5.8	149.7	62.6	42.1	30.8	1.0	3.1	11.6	17.7	20.9	10.3	21.2	68.7	0.4	155.1	43.5	-0.6	-60.2	**1,101.7**
15.5	5.9	2.4	1.2	6.9	46.6	53.5	103.5	33.7	25.5	71.9	234.2	80.2	26.0	8.8	30.3	27.1	58.5	56.6	57.4	70.3	31.2	0.1	33.3	75.7	-0.5	110.7	**2,142.2**
1.8	0.3	0.1	0.1	0.3	2.1	0.9	6.1	3.8	0.9	2.6	4.4	7.0	0.6	2.0	0.8	2.5	5.5	1.7	2.0	32.3	1,415.6	-0.1	6.5	10.9	-	-388.9	**1,161.8**
1.3	0.0	0.0	0.0	0.1	0.4	0.2	1.0	0.8	0.3	1.5	6.5	1.3	10.4	4.3	0.6	0.9	1.7	19.3	1.5	25.2	581.4	-	2.1	10.1	-	-33.6	**647.7**
0.2	0.1	0.1	0.0	0.2	1.0	0.5	0.5	0.7	0.2	0.8	1.6	1.8	0.7	1.3	2.6	0.9	0.9	1.4	1.8	20.2	507.3	0.0	0.5	15.1	-	-38.6	**529.8**
0.1	0.1	0.0	0.0	0.1	0.6	1.0	0.8	0.4	0.3	2.1	7.3	3.9	0.2	1.0	7.9	0.9	3.8	0.4	5.4	162.8	273.7	0.1	4.7	111.9	-0.0	-27.5	**569.1**
0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.5	0.3	1.6	0.0	0.0	0.1	0.3	1.0	0.0	0.1	79.9	815.1	0.0	1.7	3.0	-	74.4	**979.4**
0.4	0.1	0.1	0.0	0.2	1.5	0.2	1.9	0.8	0.7	1.8	2.5	8.2	2.4	1.2	1.5	25.5	110.3	3.9	0.9	362.6	548.4	0.1	3.5	9.7	-0.0	95.7	**1,207.2**
0.9	0.3	0.3	0.2	0.9	5.9	14.6	5.6	2.0	2.8	4.3	79.1	4.9	10.2	4.7	2.8	0.7	3.0	84.1	5.9	559.5	48.2	0.1	4.0	74.2	-0.0	-218.1	**806.7**
4.1	0.2	0.1	0.0	0.2	1.3	1.0	2.9	10.7	0.7	3.4	20.9	6.0	18.3	2.6	3.5	8.3	8.6	6.8	35.2	377.3	14.2	0.1	1.7	15.1	-0.0	-22.7	**580.9**
18.9	11.7	4.8	2.9	14.6	98.7	50.5	20.0	53.8	32.2	46.2	123.4	47.6	11.7	15.8	25.2	82.2	65.3	70.2	39.7	2,032.5	46.7	45.0	997.4	-	452.7	-	**7,062.9**
175.5	56.5	14.7	5.5	37.0	318.7	164.1	408.1	94.8	59.0	482.3	590.0	576.6	184.5	414.1	347.9	619.8	457.0	235.1	224.5	-	-	-	-	-	-	-	**10,727.3**
116.1	7.1	7.2	5.8	23.0	96.4	419.1	544.2	2,070.7	130.6	116.7	468.5	58.4	116.4	28.5	9.9	63.2	267.7	124.4	56.8	-	-	-	-	-	-	-	**7,849.0**
81.1	-3.8	-2.5	-	2.4	9.5	9.2	140.0	390.0	9.7	3.5	7.7	13.2	4.0	1.9	1.3	1.3	2.8	21.5	4.5	1,236.9	100.4	0.3	119.3	118.6	-	-	**2,883.7**
49.9	10.4	7.9	4.1	12.2	83.4	20.7	167.0	73.8	15.5	40.8	117.2	45.4	21.8	5.7	14.2	17.7	32.7	32.7	24.2	-	-	-	-	-	-	-846.3	**1,520.7**
834.1	**132.5**	**60.4**	**31.7**	**186.7**	**1,259.7**	**1,053.8**	**2,080.6**	**3,419.9**	**388.1**	**1,101.7**	**2,142.2**	**1,161.8**	**647.7**	**529.8**	**569.1**	**979.4**	**1,207.2**	**806.7**	**580.9**	**13,568.3**	**4,745.9**	**134.5**	**4,626.5**	**6,968.3**	**-**	**-**	**74,612.1**

B.15. Otago Regional Table

Table B.15: 2009 I-O table of Otago (Million NZD)

Industries		1 HFRG	2 SBLC	3 DAIF	4 OTHF	5 SAHF	6 FOLO	7 FISH	8 COAL	9 FUEL	10 OMIN	11 MEAT	12 DAIR	13 OFOD	14 BEVT	15 TCFL	16 WOOD	17 PAPR	18 PPRM	19 CHEM	20 RBPL	21 NMMP	22 BASM	23 FABM	24 MAEQ	25 OMFG	26 ELEC	27 WATS	28 WAST	29 CONS	30 TRDE	31 ACCR
1	HFRG	2.7	4.7	13.9	0.4	1.1	1.0	0.0	0.0	0.0	0.0	8.3	-	11.0	9.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.2	4.5	16.7
2	SBLC	3.8	68.7	27.7	3.7	2.1	1.0	0.0	0.0	0.0	0.0	236.4	-	6.6	2.9	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.1	19.9	2.0
3	DAIF	1.6	10.8	9.4	0.9	0.8	0.1	0.0	0.0	0.0	0.0	-	438.7	1.8	1.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	1.8	1.0
4	OTHF	3.1	7.0	5.6	3.6	1.5	0.2	0.0	0.0	0.0	0.0	28.0	1.9	2.4	0.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	1.0	0.9
5	SAHF	16.4	25.1	17.4	2.7	6.9	11.2	0.0	0.0	0.0	0.0	15.3	-	0.9	0.3	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.4	1.6	0.1
6	FOLO	0.6	1.7	3.0	0.2	0.1	27.0	0.0	0.0	0.0	0.0	2.3	-	0.1	0.3	0.1	25.1	1.6	0.1	0.1	0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.0	0.0	2.0	4.3	0.0
7	FISH	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	-	12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0
8	COAL	-	-	0.2	-	-	-	-	0.0	0.1	0.1	0.1	0.3	0.2	0.0	0.0	0.1	0.0	0.0	-	0.0	0.2	1.5	-	-	-	1.6	-	-	-	0.1	0.0
9	FUEL	1.4	6.1	5.9	1.9	3.4	5.6	0.6	4.9	80.4	5.9	2.9	3.6	6.3	1.9	1.4	2.2	0.8	7.7	6.1	0.5	1.3	1.2	1.3	3.1	0.6	29.0	0.0	0.5	18.5	16.5	2.8
10	OMIN	0.8	2.5	3.4	0.4	0.0	0.1	0.0	2.1	3.4	5.0	-	-	-	-	-	-	-	-	0.1	0.2	6.1	3.4	0.6	0.1	0.2	-	0.0	0.2	6.8	0.6	-
11	MEAT	0.4	1.3	5.6	0.8	0.1	0.0	0.1	0.2	0.0	0.3	33.4	-	2.8	-	8.3	-	-	2.0	-	0.7	-	-	-	-	-	-	-	-	-	0.5	51.4
12	DAIR	-	-	-	-	-	-	-	-	0.0	-	-	6.0	0.4	0.2	-	0.4	0.0	0.1	0.0	0.1	0.1	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.0	5.8	4.7
13	OFOD	0.6	2.5	10.2	1.4	0.3	0.1	0.6	0.0	0.0	0.0	2.9	2.1	61.5	5.7	0.1	0.3	0.1	0.5	0.0	0.1	0.1	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.1	6.1	34.7
14	BEVT	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	5.6	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	50.0
15	TCFL	0.1	0.1	0.5	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.2	5.1	0.3	0.0	0.8	0.0	0.0	0.0	0.1	0.1	0.4	0.1	0.0	0.0	0.0	2.6	6.6	0.1
16	WOOD	0.1	0.2	0.3	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.5	0.0	18.1	0.7	0.4	0.0	0.1	1.1	0.1	0.4	0.5	4.7	0.0	0.0	0.0	83.9	2.4	0.0
17	PAPR	1.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.4	0.0	0.2	1.5	2.2	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.2	0.0	0.0	0.6	1.7	0.2
18	PPRM	0.3	0.6	0.3	0.2	0.5	0.2	0.0	0.0	0.2	0.0	1.5	1.1	3.8	2.4	0.5	0.8	0.6	9.6	0.1	0.5	0.4	0.2	0.9	1.6	0.3	0.7	0.0	0.1	3.2	24.3	3.5
19	CHEM	5.1	15.4	24.9	2.1	1.9	1.9	0.0	0.1	0.5	0.1	1.2	0.8	1.1	0.3	0.2	2.7	0.7	0.4	7.7	3.0	0.3	0.2	0.9	1.4	0.2	0.2	0.0	0.0	1.4	4.4	0.2
20	RBPL	1.1	1.2	2.1	0.3	0.1	0.3	0.0	0.0	0.1	0.0	2.2	1.6	3.0	0.3	0.1	0.4	0.1	0.8	0.1	0.8	0.1	0.0	0.3	0.9	0.1	0.0	0.0	0.0	3.6	3.2	0.6
21	NMMP	0.2	0.5	0.8	0.1	0.0	0.1	0.0	0.2	0.7	0.4	0.0	0.0	0.4	3.2	0.0	0.1	0.0	0.1	0.0	0.0	12.0	0.3	0.8	4.4	0.1	0.0	0.1	0.1	60.9	2.4	0.2
22	BASM	0.0	0.2	0.1	0.0	0.2	0.7	0.0	0.0	0.3	0.1	1.4	1.0	1.1	0.5	0.2	0.8	0.3	0.7	0.2	0.2	0.9	8.9	11.3	10.2	0.9	0.1	0.1	0.0	3.3	13.1	1.6
23	FABM	0.9	2.1	2.8	0.4	0.3	0.9	0.1	0.1	0.3	0.2	1.9	1.4	3.5	8.7	0.4	1.0	0.4	0.6	0.3	0.5	0.9	5.1	17.4	19.4	0.9	0.7	0.0	0.1	19.3	12.4	3.3
24	MAEQ	0.4	1.2	2.1	0.2	1.4	0.3	0.5	0.1	1.3	0.1	0.4	0.3	0.8	0.7	0.2	0.2	0.1	0.4	0.1	0.1	0.1	0.5	0.8	12.0	0.1	2.4	0.0	0.1	16.4	8.1	1.8
25	OMFG	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.2	0.4	0.4	0.0	0.0	0.0	2.3	0.8	0.8
26	ELEC	5.8	2.8	7.7	1.3	0.2	0.5	0.1	0.3	1.3	1.8	7.8	4.2	5.2	1.2	0.7	3.1	3.1	1.2	0.9	0.5	1.7	12.7	1.0	2.0	0.3	215.2	1.0	0.1	3.1	15.3	15.5
27	WATS	-	-	-	-	0.1	0.0	0.0	0.0	0.0	0.0	1.2	0.4	0.1	0.4	0.0	-	0.0	-	-	-	-	-	-	0.0	-	0.1	3.4	0.0	0.1	0.8	0.1
28	WAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.1	0.9	0.0	0.1	1.1	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.5	0.0	0.1	0.0	10.7	3.1	0.1	0.1
29	CONS	1.9	4.7	6.5	0.8	0.3	1.3	0.1	3.1	6.0	5.2	0.2	0.1	0.3	0.5	0.2	0.5	0.3	0.1	0.0	0.1	1.9	0.1	0.6	7.7	0.1	30.4	0.0	0.6	387.6	3.4	0.3
30	TRDE	8.0	19.5	30.1	3.5	4.3	4.5	0.6	0.6	1.4	1.1	9.8	7.3	23.1	9.0	4.8	3.4	1.4	3.9	1.2	0.6	1.2	5.2	3.9	13.2	0.9	2.4	-	0.7	48.6	74.4	39.6
31	ACCR	0.2	0.3	0.3	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.2	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.1	0.0	0.0	1.4	2.6	1.3
32	RDFR	4.2	5.8	3.0	1.6	1.3	18.9	0.2	0.5	0.4	0.9	11.9	12.2	14.9	3.5	1.2	4.4	0.7	2.6	2.8	0.8	2.9	4.0	1.6	3.3	0.6	0.2	0.0	0.3	4.4	35.8	0.2
33	RDPS	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3
34	RFRT	0.2	0.3	0.3	0.1	-	0.9	-	1.6	-	0.6	1.7	0.6	1.0	0.3	0.2	0.3	0.2	0.4	0.4	0.1	0.2	0.3	0.2	0.4	0.1	-	-	-	0.1	0.6	-
35	WFRT	-	-	-	-	-	0.1	0.0	0.0	0.3	0.2	0.5	-	0.1	0.1	-	0.1	0.1	-	0.0	-	0.2	0.1	0.0	0.0	-	-	0.0	0.0	0.0	-	0.2
36	OFRT	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	-	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	-	-	0.1	0.8	-
37	OTTR	0.8	1.0	0.8	0.3	0.6	2.7	0.4	0.3	0.8	0.4	7.4	0.9	7.0	1.0	0.5	1.4	1.0	1.1	0.7	0.3	0.4	0.7	0.5	2.0	0.2	0.4	0.0	0.0	1.7	26.8	0.3
38	COMM	1.5	2.2	1.5	1.0	0.4	0.7	0.0	0.1	0.2	0.1	0.9	0.7	1.4	0.6	0.3	0.4	0.1	1.1	0.2	0.2	0.3	0.2	0.5	1.5	0.1	0.7	0.0	0.1	5.0	13.4	1.9
39	FIIN	8.6	8.9	5.4	2.4	2.6	3.4	0.7	0.2	0.8	0.3	2.6	1.9	5.3	5.8	0.9	1.8	0.3	2.3	0.5	0.6	0.8	3.9	1.3	3.1	0.4	4.4	0.0	0.2	8.4	48.7	8.9
40	HOUS	2.4	3.9	6.1	0.2	0.4	0.4	0.0	0.0	0.2	0.1	1.4	1.0	1.8	0.7	0.6	0.5	0.1	1.1	0.1	0.3	0.3	0.2	1.0	1.9	0.3	2.8	0.0	0.1	5.9	34.7	6.6
41	EHOP	1.5	1.3	1.1	0.3	0.6	0.9	0.2	0.2	0.1	0.4	0.6	0.5	1.5	0.2	0.1	0.4	0.1	0.6	0.2	0.1	0.2	0.1	0.2	0.8	0.1	1.0	0.1	0.2	1.6	4.2	0.9
42	SRCS	1.7	2.4	1.6	0.3	1.0	1.1	0.1	0.2	2.6	0.3	3.1	2.3	2.6	2.9	0.3	0.5	0.7	1.1	0.5	0.3	0.7	1.0	1.2	4.3	0.2	21.8	0.0	0.1	9.1	17.1	2.2
43	OBUS	9.0	14.2	9.6	5.3	2.5	7.8	0.5	0.4	1.7	0.7	9.1	6.7	18.4	14.2	2.8	4.4	0.7	7.5	1.2	2.1	2.7	1.7	3.7	10.2	1.1	10.3	0.3	0.6	37.0	114.8	24.9
44	GOVC	0.6	1.8	1.5	0.2	0.1	0.4	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.1	0.6	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.2	0.1	0.2	0.0	0.0	1.1	2.9	0.7
45	GOVL	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.6	0.0	1.0	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.0	0.0	1.2	0.0	0.0	0.1	0.0	-	-	0.4	0.4	0.3	0.0
46	SCHL	0.1	0.2	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.3	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.3	0.0	0.0	0.2	0.5	0.1
47	OEDU	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.5	0.0	0.0	0.6	0.5	0.1
48	HOSP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
49	OHCS	0.3	1.7	4.5	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.0	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.3	0.9	0.1
50	CULT	1.2	1.8	1.3	0.4	0.5	0.2	0.0	0.0	0.1	0.0	1.5	1.1	3.0	1.7	0.3	0.3	0.1	2.1	0.1	0.4	0.5	0.1	0.3	1.1	0.1	0.5	0.0	0.0	1.3	15.2	3.2
51	PERS	0.2	0.2	0.7	0.0	0.4	0.6	0.1	0.0	0.0	0.0	4.5	3.3	0.9	0.8	0.4	0.1	0.0	1.2	0.1	0.1	0.1	0.0	0.3	0.5	0.0	1.5	0.0	0.0	2.2	3.5	0.5
Other Imports		19.2	44.2	27.4	7.2	5.7	8.0	2.7	0.3	-	1.1	22.2	20.1	82.5	26.0	18.2	7.1	4.0	31.9	10.0	14.4	8.2	10.1	22.9	57.9	6.2	3.2	0.1	0.3	366.8	91.8	30.8
Compensation of Employees		54.3	166.0	76.6	13.6	70.3	20.6	2.4	0.6	6.0	24.4	140.1	20.3	55.7	19.9	27.8	37.3	3.9	54.8	6.1	8.0	18.9	8.9	35.3	63.8	9.2	19.4	2.1	8.8	311.7	488.8	173.7
Depreciation + Op Surplus		58.6	-23.7	98.6	5.9	-17.2	28.9	2.1	11.5	68.2	-1.2	-39.2	124.7	79.2	45.8	4.1	5.3	9.7	17.5	8.9	7.1	17.6	56.4	13.1	60.4	5.1	141.4	8.4	9.7	203.7	124.2	97.6
Net Indirect Taxes		8.5	-18.5	19.5	2.3	-0.8	1.2	-0.0	1.6	44.5	-0.1	-2.1	4.2	2.9	105.7	0.1	0.2	0.3	0.9	0.3	0.5	1.3	0.8	0.7	1.2	0.2	2.7	0.1	0.4	18.0	8.7	13.7
Domestic Import		25.2	40.2	52.7	8.9	8.9	20.5	3.2	3.0	20.8	4.8	28.2	23.1	73.9	21.6	4.0	17.0	7.7	17.7	11.1	8.2	8.3	19.5	21.9	43.7	3.4	36.9	3.5	1.1	89.5	146.1	35.9
Gross Output		**255.0**	**433.2**	**493.6**	**75.4**	**103.4**	**175.8**	**16.1**	**33.3**	**242.7**	**54.8**	**553.6**	**696.3**	**503.9**	**308.8**	**89.7**	**143.8**	**41.3**	**176.6**	**60.4**	**51.9**	**93.7**	**148.2**	**145.9**	**335.8**	**37.7**	**531.8**	**19.5**	**35.6**	**1,739.0**	**1,421.7**	**636.5**

Table B.15: 2009 I-O table of Otago (Million NZD) – Continuation (right hand side)

32 RDFR	33 RDPS	34 RFRT	35 WFRT	36 OFRT	37 OTTR	38 COMM	39 FIIN	40 HOUS	41 EHOP	42 SRCS	43 OBUS	44 GOVC	45 GOVL	46 SCHL	47 OEDU	48 HOSP	49 OHCS	50 CULT	51 PERS	Private Consumption	Government Consumption	Stock Change	Gross Investment	Exports	Import Adjustments	Final Demand	Gross Output
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.1	0.1	0.2	0.1	0.0	0.0	0.0	2.1	0.1	0.1	0.0	19.5	0.4	-0.3	0.8	112.2	-0.0	45.1	**255.0**
0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.2	0.1	0.8	0.0	2.9	0.1	0.1	0.3	19.6	-0.0	29.0	**433.2**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.2	0.0	0.7	0.3	0.0	0.3	2.5	-	19.9	**493.6**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.1	0.4	0.0	7.1	0.3	0.0	0.3	10.6	-0.0	-0.6	**75.4**
0.2	0.0	0.0	0.0	0.0	0.4	0.0	0.1	0.0	0.4	0.0	4.6	0.7	0.1	0.0	0.1	0.0	0.6	1.1	0.1	1.1	0.7	0.0	9.3	2.8	-0.0	-18.1	**103.4**
0.3	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.1	6.2	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	2.6	0.1	15.1	1.9	39.5	-0.0	40.4	**175.8**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	2.5	-0.0	-0.6	**16.1**
-	-	-	0.0	-	0.0	-	-	-	-	-	-	0.0	0.2	0.1	0.1	0.2	0.0	0.0	0.0	0.6	0.0	-	1.2	5.4	-	21.0	**33.3**
7.2	1.4	0.5	0.7	0.6	13.1	0.3	0.4	0.8	0.4	1.5	1.2	3.8	2.4	0.5	1.4	1.7	2.7	0.5	0.6	72.5	1.9	-0.7	27.2	60.7	-126.1	-58.7	**242.7**
0.3	0.0	0.3	-	-	0.0	0.0	0.0	0.1	0.0	0.1	0.1	-	-	-	-	-	-	-	-	0.2	0.1	0.0	1.0	11.9	-0.5	5.0	**54.8**
-	-	-	-	0.0	0.0	-	-	-	-	-	-	0.3	-	0.1	0.4	0.4	0.0	0.4	0.0	102.1	2.6	-	0.5	307.3	-0.0	31.5	**553.6**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	-	0.0	0.0	0.1	0.0	0.0	-	0.0	55.0	1.0	-10.7	0.6	604.6	-	27.3	**696.3**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.2	0.1	0.0	0.0	0.1	2.2	0.2	0.8	0.0	114.6	0.8	-0.4	1.4	180.3	-0.0	72.5	**503.9**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.8	0.0	128.0	2.6	1.0	0.2	80.7	-0.0	37.2	**308.8**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.0	0.3	0.4	0.1	0.1	0.3	0.1	0.1	0.3	0.0	19.2	0.3	1.2	0.4	39.0	-0.0	7.5	**89.7**
0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	1.1	0.0	2.6	0.2	0.1	0.0	0.2	0.3	0.1	0.0	0.1	0.9	1.6	0.4	1.0	1.1	47.8	-0.0	-28.3	**143.8**
0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	1.0	0.0	0.2	1.9	0.0	0.0	0.0	0.1	0.0	0.2	0.0	0.0	14.2	0.4	0.0	0.0	16.2	-0.0	-2.5	**41.3**
0.4	0.1	0.1	0.0	0.1	1.5	1.8	4.1	1.7	0.8	3.0	17.2	2.0	0.3	1.3	2.3	0.9	2.4	3.2	3.5	22.1	0.5	0.7	1.1	13.3	-0.1	33.7	**176.6**
0.4	0.1	0.1	0.0	0.0	0.7	0.0	0.0	0.1	0.1	0.1	0.3	0.1	0.1	0.1	0.2	0.8	0.8	0.1	0.4	4.3	0.1	0.1	0.1	8.0	-0.1	-35.8	**60.4**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.1	0.7	0.1	0.1	0.1	0.2	0.6	0.6	0.1	0.4	25.1	5.9	0.0	1.1	10.6	-0.1	-17.8	**51.9**
0.3	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.9	0.6	1.9	0.1	0.0	0.0	0.2	0.1	0.0	0.1	0.0	0.2	2.2	0.1	0.0	1.0	6.5	-0.2	-8.9	**93.7**
0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.4	0.1	0.0	1.4	0.5	0.0	0.0	0.2	0.1	0.0	0.2	0.2	0.0	1.3	0.0	0.0	1.3	49.3	-0.1	34.5	**148.2**
0.1	0.0	0.1	0.0	0.0	0.7	0.1	0.4	4.6	0.3	0.8	0.4	0.7	0.4	0.2	0.5	0.2	0.1	0.2	0.0	5.6	0.2	1.2	5.9	14.8	-0.1	2.2	**145.9**
0.4	0.4	0.4	0.1	0.2	5.0	2.1	0.2	0.7	0.9	1.0	1.7	2.3	1.9	0.8	2.9	2.1	0.3	1.6	0.5	37.6	0.2	2.5	71.8	107.0	-1.8	39.5	**335.8**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.1	21.7	0.4	1.0	9.7	8.2	-0.0	-11.3	**37.7**
0.2	0.1	0.4	0.0	0.1	1.6	1.1	1.2	0.2	0.3	1.9	2.6	2.4	4.5	1.9	6.6	2.0	2.9	2.7	0.9	108.6	2.3	0.0	13.6	1.3	-	54.5	**531.8**
0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	5.7	-	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.1	0.0	-	0.1	0.0	-	0.5	0.0	-0.0	5.1	**19.5**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.2	0.0	0.0	0.4	1.5	5.2	0.4	0.3	1.1	2.4	0.0	3.0	0.5	0.0	0.0	0.1	0.0	-	0.6	**35.6**
0.4	0.3	0.2	0.0	0.1	1.9	2.3	2.3	77.3	0.4	1.2	1.0	15.0	45.1	1.9	11.9	2.4	7.2	6.6	4.0	9.1	0.4	0.3	980.7	11.1	-0.0	90.7	**1,739.0**
9.9	2.9	0.5	0.1	0.3	6.2	2.7	4.4	13.2	3.4	3.1	12.9	5.8	2.0	3.0	4.1	9.0	5.7	2.5	0.2	827.2	32.3	17.3	133.2	289.7	-0.1	-298.0	**1,421.7**
0.1	0.0	0.1	0.0	0.1	1.7	0.1	0.5	0.2	0.1	0.6	1.0	4.8	0.5	1.9	3.3	1.6	4.6	1.3	1.0	190.8	3.9	0.4	0.8	181.0	-0.0	228.2	**636.5**
39.1	0.2	0.3	0.1	0.2	3.7	1.0	0.5	0.1	0.8	0.6	2.6	0.9	0.8	0.2	0.5	0.2	0.6	1.2	1.4	7.9	1.8	0.0	0.6	2.6	-	-29.9	**182.9**
0.4	0.3	0.0	0.0	0.0	0.3	0.0	0.3	0.0	0.1	0.7	0.9	0.4	0.0	1.0	1.2	0.3	1.1	0.8	0.8	15.6	10.0	0.0	0.2	4.2	-	-11.2	**29.1**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.5	0.4	-	0.3	-	-	1.5	**20.9**
0.6	0.1	0.4	-	0.0	0.1	0.1	0.0	-	-	-	-	-	-	-	-	-	-	-	-	3.5	0.4	-	0.2	-	-	-1.6	**5.7**
0.1	-	0.0	0.0	0.1	1.3	0.0	0.1	0.0	0.0	0.1	0.3	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	5.4	0.4	0.0	0.1	4.5	-0.0	-1.7	**13.1**
3.7	0.1	1.4	0.3	2.1	43.5	1.6	2.2	0.4	1.5	4.1	8.1	4.1	0.7	0.3	1.9	0.5	1.0	2.8	1.4	43.5	1.2	0.1	2.9	94.2	-0.3	-9.6	**276.2**
3.6	0.3	0.1	0.0	0.1	1.6	16.1	4.4	0.7	0.6	3.6	6.6	3.6	1.8	0.5	3.0	1.2	2.5	3.6	2.0	104.1	3.1	-0.0	4.3	12.7	-0.0	-30.0	**187.8**
2.8	0.9	0.8	0.2	0.5	10.3	2.1	113.1	30.5	5.9	7.4	19.5	9.8	3.4	1.0	5.5	3.9	10.4	10.4	9.2	151.9	4.2	0.0	6.7	15.1	-0.1	73.5	**634.4**
1.4	0.2	0.2	0.1	0.1	2.6	1.2	6.2	51.2	1.4	3.6	8.9	8.4	0.7	0.4	2.2	0.9	7.9	7.8	2.8	865.9	26.3	0.0	47.5	10.6	-0.0	-57.9	**1,075.8**
1.4	0.6	1.0	0.3	0.6	12.7	0.3	1.4	0.9	4.9	2.1	3.0	2.1	2.8	0.1	1.4	1.1	1.8	1.8	1.3	6.9	2.2	0.1	1.8	15.9	-0.0	22.6	**111.2**
0.1	0.2	0.2	0.0	0.1	2.0	1.8	13.8	0.4	1.0	26.1	10.9	7.5	6.9	0.3	0.9	2.6	4.0	6.0	2.3	7.4	25.2	0.1	45.8	12.8	-0.2	63.2	**325.2**
3.6	1.4	0.9	0.2	0.5	10.8	10.1	33.5	11.2	7.7	22.5	73.3	25.6	10.5	4.8	16.5	11.0	23.8	29.2	23.4	24.7	11.5	0.0	9.8	22.3	-0.2	-82.8	**632.4**
0.3	0.1	0.0	0.0	0.0	0.3	0.1	1.4	0.9	0.2	0.6	1.0	1.6	0.2	0.8	0.3	0.7	1.6	0.6	0.6	11.3	520.0	-0.0	2.0	3.3	-	-209.6	**349.8**
0.3	0.0	0.0	0.0	0.0	0.1	0.0	0.3	0.2	0.1	0.4	1.9	0.4	3.9	2.2	0.3	0.3	0.6	9.3	0.6	8.8	213.5	-	0.8	3.8	-	-6.6	**246.3**
0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.2	0.1	0.2	0.4	0.5	0.2	0.6	1.2	0.3	0.3	0.6	0.6	7.1	186.3	0.0	0.3	7.8	-	63.0	**272.8**
0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.1	0.1	0.6	2.2	1.2	0.1	0.5	4.1	0.3	1.5	0.2	2.1	57.1	100.5	0.0	2.4	57.6	-0.0	59.1	**293.0**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.5	0.0	0.0	0.1	0.1	0.4	0.0	0.0	28.0	299.4	0.0	0.6	1.2	-	44.6	**375.6**
0.1	0.0	0.0	0.0	0.0	0.3	0.0	0.6	0.2	0.2	0.5	0.7	2.5	0.9	0.6	0.8	9.8	42.3	1.9	0.3	127.1	201.4	0.0	1.3	3.7	-0.0	58.3	**463.0**
0.2	0.1	0.1	0.0	0.1	1.4	2.8	1.9	0.7	0.9	1.4	25.1	1.6	4.2	2.6	1.5	0.3	1.2	44.0	2.4	196.1	17.7	0.0	1.9	36.1	-0.0	9.3	**392.1**
0.8	0.1	0.0	0.0	0.0	0.3	0.2	0.8	3.1	0.2	0.9	5.8	1.7	6.5	1.2	1.7	3.0	3.1	3.1	12.6	132.3	5.2	0.0	0.7	5.8	-0.0	12.0	**223.2**
4.2	2.6	1.6	0.5	1.0	21.6	9.0	6.1	16.9	9.2	13.6	36.4	14.3	4.4	8.1	13.0	31.5	25.0	34.1	15.2	712.5	16.5	15.9	352.8	-	129.8	-	**2,446.8**
54.5	16.3	4.0	0.8	2.0	86.4	25.2	121.0	40.2	10.4	101.4	205.3	160.4	67.2	145.6	269.1	238.2	164.0	92.8	82.6	-	-	-	-	-	-	-	**3,836.9**
16.0	-6.9	4.2	1.3	2.1	6.1	78.6	168.6	642.7	43.5	74.2	107.7	28.4	47.1	78.2	-74.6	23.8	113.8	78.8	25.3	-	-	-	-	-	-	-	**2,690.9**
11.2	3.7	-1.4	-	0.2	0.6	1.7	43.4	121.0	3.2	2.2	1.8	6.4	1.6	5.1	-9.6	0.5	1.2	13.6	2.0	433.6	35.5	0.1	42.2	42.0	-	-	**981.0**
17.8	3.2	4.3	0.7	1.7	36.1	24.9	98.8	40.4	10.6	38.0	55.8	27.2	18.0	5.5	16.5	16.6	23.4	25.4	18.1	-	-	-	-	-	-	-310.8	**982.7**
182.9	**29.1**	**20.9**	**5.7**	**13.1**	**276.2**	**187.8**	**634.4**	**1,075.8**	**111.2**	**325.2**	**632.4**	**349.8**	**246.3**	**272.8**	**293.0**	**375.6**	**463.0**	**392.1**	**223.2**	**4,756.8**	**1,741.2**	**46.6**	**1,792.6**	**2,600.9**	**-**	**-**	**26,703.6**

B.16. Southland Regional Table

Table B.16: 2009 I-O table of Southland (Million NZD)

Industries		1 HFRG	2 SBLC	3 DAIF	4 OTHF	5 SAHF	6 FOLO	7 FISH	8 COAL	9 FUEL	10 OMIN	11 MEAT	12 DAIR	13 OFOD	14 BEVT	15 TCFL	16 WOOD	17 PAPR	18 PPRM	19 CHEM	20 RBPL	21 NMMP	22 BASM	23 FABM	24 MAEQ	25 OMFG	26 ELEC	27 WATS	28 WAST	29 CONS	30 TRDE	31 ACCR
1	HFRG	0.2	2.4	7.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	2.4	-	3.1	2.7	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.9	2.2
2	SBLC	0.5	77.3	31.2	4.2	0.8	0.4	0.0	0.0	0.0	0.0	146.9	-	4.1	1.8	0.7	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	8.8	0.6
3	DAIF	0.2	12.2	10.7	1.1	0.3	0.1	0.0	0.0	0.0	0.0	-	275.6	1.1	0.9	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.8	0.3
4	OTHF	0.4	7.8	6.3	4.1	0.6	0.1	0.0	0.0	0.0	0.0	17.4	1.2	1.5	0.4	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.5	0.3
5	SAHF	2.3	28.3	19.6	3.2	2.8	4.5	0.0	0.0	0.0	0.0	9.5	-	0.6	0.2	0.0	0.0	-	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.7	0.0
6	FOLO	0.1	2.0	3.6	0.3	0.0	11.5	0.0	0.0	0.0	0.0	1.5	-	0.0	0.2	0.0	12.9	-	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.0	1.0	2.0	0.0
7	FISH	0.0	0.0	0.0	0.0	0.0	0.0	6.5	0.0	0.0	0.0	0.0	-	24.3	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0
8	COAL	-	-	1.3	-	-	-	-	0.0	0.1	0.3	0.3	0.9	0.6	0.1	0.0	0.1	-	0.0	-	0.0	0.2	36.6	-	-	-	2.5	-	-	-	0.1	0.0
9	FUEL	0.0	0.5	0.5	0.2	0.1	0.2	0.1	0.1	2.0	0.2	0.1	0.2	0.3	0.1	0.0	0.1	-	0.1	0.1	0.0	0.0	0.4	0.5	0.1	0.0	0.7	0.0	0.0	0.6	0.5	0.1
10	OMIN	0.0	1.1	1.5	0.2	0.0	0.0	0.0	0.3	0.5	0.8	-	-	-	-	-	-	-	-	0.0	0.0	0.6	6.8	1.1	0.0	0.0	-	0.0	0.0	1.2	0.1	-
11	MEAT	0.1	1.4	6.3	0.9	0.1	0.0	0.2	0.1	0.0	0.1	20.7	-	1.7	-	1.4	-	-	0.4	-	0.1	-	-	-	-	-	-	-	-	-	0.2	15.0
12	DAIR	-	-	-	-	-	-	-	-	0.0	-	-	3.8	0.2	0.1	-	0.2	-	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0	2.6	1.4
13	OFOD	0.1	2.5	10.1	1.4	0.1	0.0	1.9	0.0	0.0	0.0	1.6	1.2	33.4	3.1	0.0	0.1	-	0.1	0.0	0.0	0.0	0.1	0.5	0.1	0.0	0.0	0.0	0.0	0.0	2.3	8.8
14	BEVT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
15	TCFL	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.5	0.1	-	0.1	0.0	0.0	0.0	0.3	0.4	0.1	0.0	0.0	0.0	0.0	0.7	1.7	0.0
16	WOOD	0.0	0.2	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	8.8	-	0.1	0.0	0.0	0.3	0.7	2.0	0.1	0.5	0.0	0.0	0.0	38.9	1.0	0.0
17	PAPR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	PPRM	0.0	0.6	0.3	0.2	0.2	0.1	0.0	0.0	0.1	0.0	0.8	0.6	2.0	1.3	0.1	0.4	-	1.7	0.0	0.1	0.1	0.9	3.6	0.4	0.0	0.2	0.0	0.0	1.3	9.3	0.9
19	CHEM	1.3	30.2	48.8	4.2	1.3	1.3	0.1	0.0	0.3	0.1	1.3	0.9	1.2	0.3	0.1	2.3	-	0.1	2.2	0.9	0.1	1.9	7.5	0.6	0.0	0.1	0.1	0.0	1.2	3.4	0.1
20	RBPL	0.0	0.4	0.8	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.3	0.6	0.1	0.0	0.1	-	0.1	0.0	0.0	0.0	0.1	0.5	0.1	0.0	0.0	0.0	0.0	0.6	0.5	0.1
21	NMMP	0.0	0.7	1.0	0.1	0.0	0.0	0.0	0.1	0.3	0.2	0.0	0.0	0.3	2.3	0.0	0.1	-	0.0	0.0	0.0	3.6	1.7	4.5	1.3	0.0	0.0	0.1	0.0	33.0	1.2	0.1
22	BASM	0.0	0.3	0.2	0.0	0.1	0.4	0.0	0.0	0.1	0.0	1.3	1.0	1.0	0.5	0.1	0.6	-	0.2	0.1	0.0	0.4	69.3	83.0	3.9	0.1	0.0	0.1	0.0	2.3	8.7	0.7
23	FABM	0.2	3.6	4.8	0.6	0.2	0.5	0.4	0.1	0.2	0.1	1.8	1.4	3.3	8.3	0.1	0.7	-	0.2	0.1	0.1	0.3	39.8	129.1	7.6	0.1	0.3	0.0	0.1	13.6	8.4	1.5
24	MAEQ	0.1	1.6	2.9	0.3	0.7	0.2	2.1	0.0	0.6	0.0	0.3	0.2	0.6	0.6	0.0	0.1	-	0.1	0.0	0.0	0.0	3.5	4.9	3.8	0.0	1.0	0.0	0.0	9.4	4.5	0.6
25	OMFG	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	-	0.0	0.0	0.0	0.0	0.2	0.4	0.1	0.0	0.0	0.0	0.0	0.5	0.2	0.1
26	ELEC	0.6	2.2	5.9	1.0	0.1	0.1	0.2	0.1	0.3	0.5	3.3	1.8	2.2	0.5	0.1	1.0	-	0.2	0.1	0.1	0.3	44.7	3.4	0.3	0.0	49.0	0.4	0.0	1.0	4.6	3.1
27	WATS	-	-	-	-	0.1	0.0	0.1	0.0	0.0	0.0	0.9	0.3	0.1	0.3	0.0	-	-	-	-	-	-	-	-	0.0	-	0.0	2.5	0.0	0.0	0.4	0.1
28	WAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.3	0.0	0.0	0.3	-	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	2.7	0.9	0.0	0.0
29	CONS	0.3	5.0	6.9	0.9	0.1	0.5	0.4	1.2	2.0	2.0	0.1	0.1	0.2	0.3	0.0	0.2	-	0.0	0.0	0.0	0.5	0.7	2.8	1.9	0.0	9.6	0.0	0.2	169.7	1.4	0.1
30	TRDE	1.1	21.5	33.2	3.9	1.7	1.8	1.8	0.3	0.5	0.4	6.0	4.4	14.1	5.5	0.8	1.6	-	0.8	0.2	0.1	0.3	26.5	18.4	3.3	0.1	0.8	-	0.3	22.1	32.3	11.3
31	ACCR	0.0	0.3	0.4	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	-	0.0	0.0	0.0	0.0	0.2	0.4	0.1	0.0	0.0	0.0	0.0	0.7	1.1	0.4
32	RDFR	0.6	7.0	3.7	2.0	0.6	8.3	0.6	0.2	0.2	0.4	8.0	8.2	10.0	2.4	0.2	2.3	-	0.6	0.5	0.1	0.8	22.1	8.3	0.9	0.1	0.1	0.0	0.1	2.2	17.2	0.1
33	RDPS	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1
34	RFRT	0.0	0.5	0.4	0.1	-	0.5	-	0.9	-	0.4	1.4	0.5	0.9	0.3	0.0	0.2	-	0.1	0.1	0.0	0.1	2.3	1.6	0.1	0.0	-	-	-	0.1	0.3	-
35	WFRT	-	-	-	-	-	0.0	0.0	0.0	0.1	0.1	0.4	-	0.1	0.0	-	0.0	-	-	0.0	-	0.1	0.4	0.1	0.0	-	-	0.0	0.0	0.0	-	0.1
36	OFRT	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	-	0.2	0.0	0.2	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	-	-	0.0	0.6	-
37	OTTR	0.1	1.2	0.9	0.4	0.3	1.1	1.5	0.1	0.3	0.2	4.7	0.6	4.4	0.6	0.1	0.7	-	0.2	0.1	0.1	0.1	3.9	2.3	0.5	0.0	0.1	0.0	0.0	0.8	12.2	0.1
38	COMM	0.2	1.8	1.2	0.8	0.1	0.2	0.1	0.0	0.0	0.0	0.4	0.3	0.6	0.3	0.0	0.2	-	0.2	0.0	0.0	0.1	0.9	1.7	0.3	0.0	0.2	0.0	0.0	1.7	4.4	0.4
39	FIIN	1.2	10.3	6.2	2.8	1.1	1.4	2.5	0.1	0.3	0.1	1.7	1.2	3.3	3.7	0.1	0.9	-	0.5	0.1	0.1	0.2	20.3	6.5	0.8	0.0	1.5	0.0	0.1	4.0	22.1	2.6
40	HOUS	0.3	4.1	6.5	0.2	0.2	0.2	0.1	0.0	0.1	0.0	0.8	0.6	1.0	0.4	0.1	0.2	-	0.2	0.0	0.0	0.1	1.1	4.7	0.5	0.0	0.9	0.0	0.0	2.6	14.6	1.8
41	EHOP	0.2	1.1	0.9	0.2	0.2	0.3	0.5	0.1	0.0	0.1	0.3	0.2	0.7	0.1	0.0	0.2	-	0.1	0.0	0.0	0.0	0.6	0.9	0.1	0.0	0.3	0.0	0.1	0.5	1.4	0.2
42	SRCS	0.1	1.1	0.8	0.1	0.2	0.2	0.2	0.0	0.4	0.1	0.8	0.6	0.7	0.8	0.0	0.1	-	0.1	0.0	0.0	0.1	2.2	2.4	0.5	0.0	3.1	0.0	0.0	1.8	3.2	0.3
43	OBUS	0.8	9.8	6.6	3.8	0.6	1.9	1.0	0.1	0.4	0.2	3.5	2.5	7.0	5.4	0.3	1.3	-	0.9	0.1	0.2	0.4	5.2	11.1	1.6	0.1	2.1	0.1	0.1	10.5	31.1	4.4
44	GOVC	0.1	1.9	1.6	0.2	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.3	-	0.0	0.0	0.0	0.0	0.2	0.4	0.0	0.0	0.1	0.0	0.0	0.5	1.2	0.2
45	GOVL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.5	0.1	0.1	0.1	0.1	0.0	0.0	-	0.0	0.0	0.0	0.4	0.1	0.1	0.0	0.0	-	-	0.2	0.2	0.2	0.0
46	SCHL	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	-	0.1	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	0.1	0.2	0.0
47	OEDU	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0
48	HOSP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	OHCS	0.0	1.8	4.8	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	-	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.0
50	CULT	0.1	1.5	1.0	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.6	0.5	1.3	0.8	0.0	0.1	-	0.3	0.0	0.0	0.1	0.5	1.0	0.2	0.0	0.1	0.0	0.0	0.4	4.8	0.7
51	PERS	0.0	0.2	0.6	0.0	0.1	0.2	0.2	0.0	0.0	0.0	2.3	1.7	0.5	0.4	0.1	0.0	-	0.2	0.0	0.0	0.0	0.1	1.1	0.1	0.0	0.4	0.0	0.0	0.8	1.3	0.1
	Other Imports	2.7	49.8	30.9	8.3	2.3	3.2	8.9	0.1	-	0.5	13.8	12.5	51.2	16.1	3.0	3.4	-	6.6	1.7	2.3	2.1	52.0	111.5	14.8	0.6	1.1	0.1	0.1	170.1	40.7	9.0
	Compensation of Employees	14.8	181.9	145.2	17.5	62.5	11.5	7.5	4.6	0.3	1.7	220.0	22.8	19.1	0.1	6.9	29.6	-	16.5	5.8	1.2	11.6	102.6	29.9	36.8	2.0	8.4	1.6	3.4	125.9	250.8	52.3
	Depreciation + Op Surplus	2.0	-23.9	61.9	5.6	-39.6	8.5	7.5	0.9	24.6	7.2	-150.6	67.6	64.1	32.2	-1.5	-8.4	-	-1.3	-3.2	1.2	-1.7	234.8	199.2	-4.6	-0.6	45.2	4.7	4.0	111.6	23.1	27.0
	Net Indirect Taxes	0.3	-18.7	12.2	2.2	-1.9	0.4	-0.0	0.1	16.1	0.5	-8.0	2.3	2.4	74.2	-0.0	-0.3	-	-0.1	-0.1	0.1	-0.1	3.3	10.4	-0.1	-0.0	0.9	0.0	0.2	9.9	1.6	3.8
	Domestic Import	4.7	53.6	65.9	14.9	5.2	10.2	8.8	3.5	34.2	5.6	26.1	15.9	47.7	23.6	1.4	9.1	-	6.9	2.0	1.3	3.0	76.1	53.5	9.3	0.4	48.3	1.9	2.3	63.2	99.1	34.3
	Gross Output	**35.8**	**487.7**	**555.7**	**87.3**	**41.4**	**70.8**	**53.8**	**13.6**	**83.8**	**22.4**	**343.9**	**432.6**	**313.1**	**191.8**	**14.9**	**70.0**	**-**	**36.4**	**10.1**	**8.4**	**24.2**	**764.0**	**711.3**	**85.9**	**3.8**	**177.3**	**11.7**	**14.2**	**806.3**	**630.0**	**185.5**

Table B.16: 2009 I-O table of Southland (Million NZD) – Continuation (right hand side)

32 RDFR	33 RDPS	34 RFRT	35 WFRT	36 OFRT	37 OTTR	38 COMM	39 FIIN	40 HOUS	41 EHOP	42 SRCS	43 OBUS	44 GOVC	45 GOVL	46 SCHL	47 OEDU	48 HOSP	49 OHCS	50 CULT	51 PERS	Private Consumption	Government Consumption	Stock Change	Gross Investment	Exports	Import Adjustments	Final Demand	Gross Output
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	9.1	0.2	-0.0	0.1	15.8	-0.0	-11.6	**35.8**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	1.4	0.0	0.1	0.3	22.1	-0.0	185.7	**487.7**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.3	0.1	0.0	0.3	2.8	-	248.3	**555.7**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	3.3	0.2	0.1	0.4	12.3	-0.0	30.0	**87.3**
0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.0	1.2	0.2	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.5	0.3	0.0	3.7	1.1	-0.0	-39.1	**41.4**
0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.1	6.1	0.8	15.9	-0.0	8.9	**70.8**
0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	8.2	-0.0	13.0	**53.8**
-	-	-	0.0	-	0.0	-	-	-	-	-	-	0.0	0.6	0.1	0.2	0.4	0.0	0.0	0.0	0.3	0.0	-	0.5	2.2	-	-33.9	**13.6**
0.3	0.1	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	33.9	0.9	-0.2	9.4	20.9	-43.5	53.3	**83.8**
0.1	0.0	0.1	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-	-	-	-	0.1	0.0	0.0	0.4	4.9	-0.2	2.7	**22.4**
-	-	-	-	0.0	0.0	-	-	-	-	-	-	0.1	-	0.0	0.1	0.1	0.0	0.1	0.0	47.7	1.2	-	0.3	190.9	-0.0	54.5	**343.9**
0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	25.7	0.5	-6.6	0.4	375.6	-	28.1	**432.6**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.1	0.1	0.0	53.6	0.4	-0.2	0.9	112.0	-0.0	77.8	**313.1**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	59.9	1.2	0.6	0.1	50.2	-0.0	79.5	**191.8**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	0.2	0.2	0.1	6.5	-0.0	-6.3	**14.9**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.7	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.4	0.8	0.2	0.5	0.5	23.3	-0.0	-10.8	**70.0**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.6	0.2	-	-	-	-	-6.8	
0.2	0.1	0.1	0.0	0.0	0.7	0.8	1.5	0.5	0.2	0.7	3.8	0.5	0.2	0.3	0.5	0.3	0.8	0.5	1.2	10.3	0.2	0.1	0.2	2.7	-0.0	-15.2	**36.4**
0.4	0.1	0.1	0.0	0.0	0.7	0.0	0.0	0.1	0.1	0.0	0.2	0.1	0.1	0.0	0.1	0.6	0.5	0.0	0.3	2.0	0.0	0.0	0.0	1.3	-0.0	-108.5	**10.1**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	11.7	2.7	0.0	0.2	1.7	-0.0	-13.2	**8.4**
0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.3	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	1.0	0.0	0.0	0.3	1.7	-0.0	-31.4	**24.2**
0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.0	0.0	0.5	0.2	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.6	0.0	0.2	6.6	254.1	-0.3	326.6	**764.0**
0.1	0.0	0.1	0.0	0.0	0.6	0.1	0.3	2.5	0.1	0.3	0.2	0.3	0.4	0.1	0.2	0.1	0.0	0.1	0.0	2.6	0.1	5.8	28.6	72.1	-0.5	369.6	**711.3**
0.3	0.2	0.3	0.1	0.2	3.4	1.3	0.1	0.3	0.4	0.3	0.5	0.9	1.8	0.3	0.9	1.0	0.1	0.4	0.3	17.6	0.1	0.6	18.4	27.4	-0.5	-29.3	**85.9**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.2	0.2	0.1	1.0	0.8	-0.0	-10.6	**3.8**
0.1	0.0	0.2	0.0	0.0	0.6	0.4	0.3	0.1	0.1	0.3	0.5	0.5	2.3	0.3	1.1	0.5	0.8	0.3	0.3	50.8	1.1	0.0	4.5	0.4	-	-15.4	**177.3**
0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	2.5	-	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	-	0.3	0.0	-0.0	3.0	**11.7**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.3	2.4	0.1	0.0	0.3	0.6	0.0	0.8	0.2	0.0	0.0	0.0	0.0	-	3.7	**14.2**
0.2	0.2	0.1	0.0	0.1	1.0	1.1	0.9	25.7	0.1	0.3	0.3	4.3	31.0	0.4	2.8	0.9	2.6	1.2	1.5	4.3	0.2	0.2	454.7	5.1	-0.0	60.0	**806.3**
5.4	1.6	0.3	0.1	0.2	3.4	1.4	1.8	4.6	1.1	0.8	3.3	1.7	1.4	0.7	1.0	3.4	2.2	0.5	0.1	386.9	14.7	7.7	59.0	128.3	-0.0	-216.5	**630.0**
0.1	0.0	0.1	0.0	0.1	0.9	0.0	0.2	0.1	0.0	0.2	0.3	1.5	0.3	0.5	0.8	0.6	1.8	0.2	0.4	89.3	1.8	0.1	0.2	52.8	-0.0	29.2	**185.5**
23.6	0.1	0.2	0.1	0.2	2.3	0.6	0.2	0.0	0.3	0.2	0.7	0.3	0.6	0.1	0.1	0.1	0.3	0.2	0.6	3.7	0.8	0.0	0.4	1.5	-	-43.1	**101.7**
0.2	0.2	0.0	0.0	0.0	0.2	0.0	0.1	0.0	0.0	0.2	0.2	0.1	0.0	0.3	0.3	0.1	0.5	0.2	0.3	7.3	4.6	0.0	0.1	2.3	-	-2.1	**16.2**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.5	0.2	-	0.2	-	-	-0.8	**13.9**
0.5	0.1	0.4	-	0.0	0.1	0.1	0.0	-	-	-	-	-	-	-	-	-	-	-	-	1.6	0.2	-	0.2	-	-	-0.8	**3.8**
0.1	-	0.0	0.0	0.1	1.2	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.2	0.0	0.1	3.6	-0.0	0.3	**10.2**
2.1	0.1	0.9	0.2	1.7	24.8	0.9	1.0	0.1	0.5	1.1	2.2	1.3	0.5	0.1	0.5	0.2	0.4	0.5	0.6	20.4	0.5	0.1	1.6	52.4	-0.2	1.4	**153.6**
1.5	0.1	0.1	0.0	0.0	0.7	6.1	1.4	0.2	0.2	0.7	1.3	0.8	0.9	0.1	0.6	0.3	0.7	0.5	0.6	48.7	1.4	-0.0	2.2	6.6	-0.0	5.4	**97.2**
1.6	0.5	0.6	0.2	0.4	5.9	1.1	50.1	11.0	2.0	2.0	5.2	3.1	2.5	0.2	1.4	1.5	4.1	2.0	3.8	71.0	1.9	0.0	2.9	6.5	-0.0	-2.6	**274.6**
0.8	0.1	0.1	0.0	0.1	1.4	0.6	2.6	17.0	0.5	0.9	2.2	2.4	0.5	0.1	0.5	0.3	2.9	1.4	1.1	405.0	12.0	0.0	16.7	3.7	-0.0	-136.2	**378.1**
0.6	0.2	0.5	0.1	0.4	5.3	0.1	0.5	0.2	1.2	0.4	0.6	0.5	1.5	0.0	0.3	0.3	0.5	0.3	0.4	3.2	1.0	0.0	0.6	5.4	-0.0	4.5	**37.9**
0.0	0.0	0.0	0.0	0.0	0.5	0.4	2.5	0.1	0.1	2.9	1.2	1.0	2.1	0.0	0.1	0.4	0.7	0.5	0.4	3.5	11.5	0.0	11.9	3.3	-0.0	21.2	**84.3**
1.2	0.5	0.4	0.1	0.2	3.7	3.2	8.9	2.4	1.6	3.6	11.6	4.8	4.7	0.7	2.5	2.6	5.6	3.4	5.7	11.5	5.2	0.0	2.6	5.8	-0.0	-41.8	**164.0**
0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.6	0.3	0.1	0.1	0.2	0.5	0.1	0.2	0.1	0.3	0.6	0.1	0.2	5.3	236.7	-0.0	0.6	1.0	-	-147.9	**107.0**
0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.6	0.1	3.3	0.6	0.1	0.1	0.3	2.0	0.3	4.1	97.2	-	0.6	2.8	-	64.2	**179.4**
0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.2	0.1	0.3	0.1	0.1	0.1	0.2	3.3	84.8	0.0	0.1	1.9	-	-25.7	**68.0**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.0	0.1	0.4	0.1	0.2	0.0	0.4	26.7	45.8	0.0	0.6	14.3	-0.0	-16.8	**73.0**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	13.1	136.3	0.0	0.2	0.4	-	-6.1	**144.5**
0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2	0.1	0.1	0.1	0.2	0.7	0.6	0.1	0.2	3.5	15.4	0.3	0.1	59.5	91.7	0.0	0.5	1.4	-0.0	-5.0	**178.2**
0.1	0.0	0.1	0.0	0.0	0.6	1.0	0.6	0.2	0.2	0.3	4.6	0.3	2.2	0.5	0.3	0.1	0.3	6.0	0.7	91.7	8.1	0.0	0.4	6.9	-0.0	-65.1	**74.7**
0.4	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.9	0.1	0.2	1.3	0.4	4.0	0.3	0.4	1.0	1.0	0.5	4.2	61.9	2.4	0.0	0.3	2.3	-0.0	-4.0	**88.8**
2.3	1.4	1.1	0.3	0.8	12.0	4.7	2.6	6.0	3.1	3.5	9.4	4.4	3.2	2.0	3.2	12.1	9.6	6.5	6.1	333.3	8.9	8.6	191.0	-	45.4	-	**1,301.4**
63.2	14.0	2.6	0.5	1.6	41.0	9.3	58.0	17.0	4.2	19.7	75.4	79.8	51.5	67.9	27.6	82.4	68.2	37.4	34.7	-	-	-	-	-	-	-	**2,150.9**
-10.5	-14.6	2.8	0.8	1.7	9.8	44.3	68.5	223.5	14.2	25.7	6.1	-16.4	31.9	-10.2	16.4	18.2	38.8	-1.8	8.3	-	-	-	-	-	-	-	**1,154.9**
-7.3	7.9	-1.0	-	0.2	1.0	1.0	17.6	42.1	1.1	0.8	0.1	-3.7	1.1	-0.7	2.1	0.4	0.4	-0.3	0.7	202.8	19.2	0.1	22.8	22.7	-	-	**442.3**
13.2	3.0	3.6	1.0	2.0	30.3	18.4	52.4	18.6	5.4	16.9	27.9	15.2	25.8	2.4	7.7	10.4	17.4	10.7	14.1	-	-	-	-	-	-	-624.1	**404.1**
101.7	**16.2**	**13.9**	**3.8**	**10.2**	**153.6**	**97.2**	**274.6**	**378.1**	**37.9**	**84.3**	**164.0**	**107.0**	**179.4**	**68.0**	**73.0**	**144.5**	**178.2**	**74.7**	**88.8**	**2,224.8**	**797.1**	**24.6**	**848.7**	**1,558.4**	**-**	**-**	**13,990.3**

C.1. 2009 I-O Table after the constraint – Mixed I-O

Table C.1: National 2009 I-O table after the constraint (Million NZD)

	Industries	1 HFRG	2 SBLC	3 DAIF	4 OTHF	5 SAHF	6 FOLO	7 FISH	8 COAL	9 FUEL	10 OMIN	11 MEAT	12 DAIR	13 OFOD	14 BEVT	15 TCFL	16 WOOD	17 PAPR	18 PPRM	19 CHEM	20 RBPL	21 NMMP	22 BASM	23 FABM	24 MAEQ	25 OMFG	26 ELEC
1	HFRG	32.9	74.5	221.4	7.7	22.7	20.8	0.1	0.0	0.1	0.0	137.1	-	181.3	156.6	1.5	0.2	0.1	0.1	0.1	0.8	0.1	0.0	0.1	0.3	0.0	-
2	SBLC	46.0	1,097.7	443.2	64.4	45.4	21.8	0.0	0.0	0.0	0.0	3,883.4	-	107.9	48.1	90.2	1.0	0.2	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	-
3	DAIF	19.8	173.8	151.6	16.0	16.6	3.1	0.0	0.0	0.0	0.0	-	7,286.3	29.3	24.7	5.5	0.3	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.1	0.0	-
4	OTHF	36.9	111.2	89.3	62.5	31.8	3.2	0.1	0.0	0.0	0.0	460.2	31.4	40.2	11.8	5.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	-
5	SAHF	198.0	401.9	278.9	48.0	148.1	232.8	0.9	0.2	0.4	0.4	250.9	-	14.7	4.5	1.6	2.3	0.8	0.5	6.9	1.7	1.4	0.8	0.7	3.9	0.2	0.7
6	FOLO	8.9	32.8	59.3	4.8	1.5	698.4	0.9	0.7	0.2	1.2	47.2	-	1.5	5.8	2.6	893.4	139.2	2.3	5.6	0.6	0.9	0.7	2.5	5.8	3.3	0.9
7	FISH	0.2	0.2	0.5	0.0	0.9	0.7	121.6	0.2	0.6	0.4	0.1	-	642.0	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.2	0.9	0.2
8	COAL	-	-	17.9	-	-	-	-	2.2	13.7	13.6	6.6	23.1	16.7	1.8	2.4	8.5	3.7	0.6	-	2.5	24.6	207.7	-	-	-	144.8
9	FUEL	20.1	114.4	110.7	39.6	86.0	135.8	42.6	122.5	3,642.0	148.9	55.9	68.5	120.2	35.9	32.9	75.2	69.7	192.2	637.6	53.1	42.5	40.3	61.1	110.7	31.8	651.5
10	OMIN	9.7	39.9	54.9	6.2	1.1	2.1	0.6	46.1	132.6	107.6	-	-	-	-	-	-	-	-	8.3	17.0	166.6	100.6	23.2	3.7	8.8	-
11	MEAT	4.4	20.1	89.7	14.3	2.7	1.0	3.6	4.1	0.1	6.8	548.2	-	45.4	-	167.4	-	-	43.1	-	62.5	-	-	-	-	-	-
12	DAIR	-	-	-	-	-	-	-	-	1.4	-	-	101.4	6.4	3.7	-	11.5	3.2	1.5	2.5	4.7	1.9	0.3	2.1	7.0	2.5	0.1
13	OFOD	8.5	48.4	198.1	30.5	6.9	2.4	48.3	0.7	1.0	1.2	57.9	42.7	1,224.0	113.9	2.6	9.3	5.2	12.0	5.4	14.6	2.0	1.1	5.5	9.9	2.7	0.4
14	BEVT	0.6	0.4	0.4	0.2	0.2	0.2	0.1	0.0	0.1	0.0	0.3	0.2	7.2	91.6	0.3	0.5	0.2	1.1	0.3	0.6	0.2	0.2	0.6	1.2	0.2	0.1
15	TCFL	1.5	1.4	7.3	0.3	2.8	3.4	1.1	0.0	0.5	0.0	1.3	1.0	4.7	3.6	103.2	7.5	1.9	16.0	0.6	2.9	0.9	2.4	5.2	11.5	7.0	0.2
16	WOOD	0.9	2.9	4.1	0.6	0.1	14.8	0.1	0.2	0.4	0.3	0.9	0.6	1.1	8.3	0.9	520.5	46.9	8.4	0.5	5.1	31.2	4.1	15.7	16.7	221.1	0.3
17	PAPR	47.1	4.2	4.4	4.5	1.8	2.6	0.2	0.9	1.4	1.4	5.0	3.7	11.0	25.5	1.0	26.0	386.8	175.2	4.7	47.6	11.8	2.7	1.8	11.9	7.9	16.9
18	PPRM	3.5	10.3	4.2	3.9	9.9	4.2	0.6	0.4	8.3	0.6	24.0	17.7	62.8	38.9	10.3	24.2	43.3	203.4	12.7	40.1	12.0	5.9	33.4	50.0	14.8	13.3
19	CHEM	119.3	474.8	768.3	71.4	77.5	77.4	2.5	2.7	35.1	4.5	37.4	26.5	34.1	9.4	6.9	148.0	90.3	15.2	1,338.6	508.5	14.9	11.9	65.9	82.3	19.2	6.1
20	RBPL	57.2	86.5	152.2	26.1	9.7	24.8	1.9	1.5	9.8	2.5	160.7	118.5	223.5	21.8	9.6	48.1	19.3	71.5	44.0	321.7	6.8	6.4	57.5	115.8	26.6	1.3
21	NMMP	2.9	9.8	14.3	1.8	1.2	1.8	0.3	5.8	29.4	9.6	0.9	0.6	7.4	62.1	0.3	4.3	0.8	2.9	0.8	4.6	379.0	9.4	35.6	155.2	7.9	0.1
22	BASM	0.8	3.8	3.4	0.5	6.6	21.2	0.1	1.5	15.3	2.5	35.0	25.8	27.7	13.4	7.0	34.9	34.1	21.5	29.9	26.2	37.3	392.9	660.9	468.2	65.0	2.8
23	FABM	16.1	50.5	68.7	9.4	10.3	27.9	6.9	3.5	17.2	5.7	48.5	35.7	86.2	218.5	13.1	43.8	38.9	17.8	37.3	62.0	35.5	225.7	1,028.3	900.4	65.7	19.8
24	MAEQ	10.2	35.5	62.8	6.2	58.2	12.3	60.0	2.2	95.7	3.7	13.1	9.7	24.5	22.7	7.8	10.0	11.7	18.1	21.8	13.7	6.5	30.4	60.1	689.6	8.4	86.5
25	OMFG	0.6	1.9	2.9	0.4	0.3	2.5	0.1	0.2	0.3	0.4	1.0	0.8	2.6	8.6	0.6	2.5	1.1	3.7	0.6	3.2	1.5	4.5	13.4	25.0	41.4	0.3
26	ELEC	70.2	45.2	123.6	23.0	4.0	9.8	6.0	7.5	48.6	37.9	128.9	68.7	84.9	20.5	13.7	89.9	220.0	24.8	79.9	44.5	46.9	371.0	39.6	60.1	12.6	4,137.2
27	WATS	-	-	-	-	4.7	0.1	2.7	0.2	1.2	0.3	38.8	11.7	4.2	11.2	0.9	-	0.1	-	-	-	-	-	-	1.6	-	1.9
28	WAST	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	14.3	17.8	14.5	0.1	1.1	30.9	0.1	3.6	10.7	2.3	0.1	1.1	0.2	16.1	1.4	1.2
29	CONS	22.9	75.2	104.5	14.6	5.4	27.9	7.9	67.2	233.2	111.1	3.1	2.3	4.5	8.6	4.5	14.8	18.7	3.2	3.1	5.7	50.3	3.9	23.9	234.2	5.2	585.2
30	TRDE	108.7	349.5	540.5	68.7	103.4	106.6	39.5	15.7	58.8	25.9	181.4	133.8	427.0	166.4	108.9	108.1	111.5	94.0	117.1	53.8	36.1	172.2	167.9	450.5	47.5	51.4
31	ACCR	2.2	4.3	5.1	1.2	2.7	2.9	0.1	0.6	2.5	1.0	1.8	1.4	3.3	1.9	1.3	1.7	0.7	2.4	1.8	3.0	1.2	1.0	3.3	7.5	1.2	2.3
32	RDFR	55.5	100.0	52.1	30.0	29.9	429.3	10.9	12.4	16.9	20.5	211.6	217.7	265.2	62.7	26.9	137.8	57.7	59.5	271.0	79.2	85.3	125.4	65.7	107.9	29.1	3.3
33	RDPS	0.5	1.2	1.1	0.6	0.6	0.6	0.2	0.1	0.1	0.1	0.8	0.6	0.9	0.4	0.1	0.4	0.2	0.3	0.7	0.4	0.5	0.2	0.3	1.3	0.2	0.5
34	RFRT	3.4	8.4	6.1	2.1	-	28.4	-	52.0	-	20.8	42.2	15.5	25.3	7.8	5.5	13.1	26.1	11.4	50.6	15.2	10.1	14.7	14.2	17.1	5.7	-
35	WFRT	-	-	-	-	-	6.9	2.4	4.4	59.2	30.7	46.0	-	11.5	5.6	-	9.5	28.5	-	9.2	-	25.7	10.7	2.6	3.1	-	-
36	OFRT	1.4	2.3	1.7	0.9	2.0	7.6	3.9	0.4	2.6	-	15.5	1.9	15.7	2.1	1.5	5.3	8.8	3.1	8.5	4.1	0.7	2.6	2.4	8.6	1.6	1.1
37	OTTR	11.0	18.6	13.6	6.9	15.4	63.6	31.4	7.4	34.9	8.8	136.2	16.0	128.5	18.3	12.1	44.8	77.9	25.3	72.4	33.6	12.3	24.2	20.3	69.9	12.7	8.4
38	COMM	38.6	71.6	48.6	35.2	18.7	29.1	6.4	3.9	12.8	6.4	31.5	23.3	47.3	20.0	10.6	25.2	18.1	48.5	34.3	43.3	17.9	14.7	38.4	97.7	13.1	29.6
39	FIIN	172.7	237.9	142.6	70.0	94.5	117.7	76.2	6.9	54.8	11.5	71.4	52.7	143.8	158.1	28.7	85.6	41.1	81.7	78.3	79.3	35.5	187.4	84.8	155.1	29.2	141.8
40	HOUS	28.6	62.1	98.0	2.7	8.6	8.9	1.3	0.8	6.3	1.3	22.5	16.6	29.0	11.4	12.3	15.3	4.1	23.9	13.1	23.1	8.7	6.9	39.7	57.2	15.4	54.3
41	EHOP	24.6	28.1	23.7	6.0	16.3	26.1	17.9	6.3	6.8	10.4	13.6	10.0	34.0	5.3	3.1	17.1	5.4	17.0	24.2	10.8	5.7	5.9	12.4	31.0	4.7	27.2
42	SRCS	36.1	66.0	45.2	8.7	39.3	41.7	16.5	6.7	174.3	11.1	89.8	66.3	75.8	82.8	10.1	23.2	87.0	41.8	85.9	51.1	34.0	52.3	80.3	228.1	12.7	736.8
43	OBUS	123.2	257.0	172.7	106.2	61.0	185.0	35.2	10.0	76.4	16.6	168.6	124.4	341.2	264.0	63.4	140.9	55.8	180.2	118.8	207.1	83.1	54.6	163.2	352.4	58.7	224.6
44	GOVC	12.4	50.5	41.6	6.8	3.9	13.8	3.9	0.8	2.1	1.4	3.9	2.9	7.0	3.0	1.9	29.0	4.9	4.7	3.3	4.2	5.7	1.8	6.5	10.5	6.1	5.5
45	GOVL	0.2	0.6	0.3	0.1	0.4	1.6	0.1	15.7	0.4	25.9	1.8	1.3	2.6	1.3	0.8	2.4	0.5	1.7	1.3	0.9	37.5	0.4	1.0	3.3	0.3	-
46	SCHL	1.1	3.0	3.4	0.8	0.5	1.3	0.2	0.2	0.9	0.3	0.8	0.6	1.8	1.0	0.7	5.1	0.5	7.3	0.6	1.7	0.4	0.3	3.4	3.2	0.5	6.9
47	OEDU	0.8	0.8	0.4	0.6	0.6	2.1	0.1	0.0	0.6	0.1	0.6	0.4	1.2	0.8	0.2	9.3	0.2	0.6	0.5	2.0	0.3	0.1	0.8	1.6	0.2	9.7
48	HOSP	0.1	0.2	0.3	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.0	0.1	0.3	0.0	0.2
49	OHCS	3.1	26.6	72.6	2.2	2.5	1.0	0.2	0.1	0.3	0.1	1.4	1.0	1.2	3.5	0.3	2.3	3.5	2.6	0.5	1.6	2.2	0.4	2.2	4.1	0.2	2.7
50	CULT	13.9	29.5	20.8	7.4	11.7	3.2	0.2	0.3	2.5	0.5	24.0	17.7	49.7	28.2	5.2	9.8	4.1	45.4	9.4	36.8	13.4	3.6	11.4	34.5	5.8	10.4
51	PERS	2.0	4.2	11.2	0.9	9.9	14.5	5.0	0.2	1.5	0.3	78.7	58.0	16.1	13.7	9.3	1.8	0.7	26.7	4.9	6.5	1.7	0.9	10.8	16.0	1.3	30.8
	Other Imports	232.1	706.9	438.7	126.6	123.4	166.1	168.1	5.6	-	24.6	365.5	330.8	1,355.1	426.9	367.2	202.3	289.5	678.0	898.7	1,242.8	221.2	294.8	887.8	1,764.9	289.6	61.5
	Compensation of Employees	966.6	1,378.8	1,572.0	242.8	890.6	461.2	136.5	55.2	189.2	189.8	1,372.7	514.7	1,126.4	427.1	455.5	714.3	398.1	915.2	236.8	721.0	485.4	451.0	1,105.9	2,346.2	387.0	559.3
	Depreciation + Op Surplus	435.1	336.5	1,287.2	101.5	222.3	572.8	146.2	209.7	2,668.1	284.9	238.0	1,873.1	1,097.1	722.6	184.8	493.8	583.5	608.1	1,100.7	586.4	502.1	1,459.2	762.0	1,446.9	279.4	2,535.7
	Net Indirect Taxes	63.4	262.9	254.6	39.6	10.8	23.8	-0.9	30.1	1,740.8	20.3	12.6	63.7	40.5	1,665.8	4.6	19.4	20.8	29.6	33.4	37.3	38.4	20.4	39.9	29.9	9.8	47.7
	Gross Output	**3,076.5**	**6,925.1**	**7,890.9**	**1,325.6**	**2,226.0**	**3,669.6**	**1,010.5**	**716.1**	**9,401.3**	**1,174.0**	**9,093.9**	**11,439.0**	**8,277.9**	**5,072.4**	**1,808.1**	**4,125.1**	**2,965.8**	**3,747.8**	**5,428.3**	**4,492.7**	**2,539.8**	**4,329.9**	**5,664.9**	**10,230.1**	**1,766.5**	**10,223.2**

Table C.1: National 2009 I-O table after the constraint (Million NZD) – continuation, right hand side

27 WATS	28 WAST	29 CONS	30 TRDE	31 ACCR	32 RDFR	33 RDPS	34 RFRT	35 WFRT	36 OFRT	37 OTTR	38 COMM	39 FIIN	40 HOUS	41 EHOP	42 SRCS	43 OBUS	44 GOVC	45 GOVL	46 SCHL	47 OEDU	48 HOSP	49 OHCS	50 CULT	51 PERS	Final Demand	Gross Output
-	0.0	3.2	139.6	190.6	0.2	0.0	0.1	0.1	0.1	0.8	0.1	1.6	10.6	1.8	3.3	6.7	3.5	0.1	0.1	0.4	38.8	1.3	2.9	0.5	1,811.5	**3,076.5**
-	0.0	1.5	617.4	22.9	1.0	0.0	0.1	0.1	0.2	2.0	0.0	0.6	4.1	5.0	3.8	1.9	3.0	0.0	0.1	0.2	3.4	1.0	17.6	0.3	388.8	**6,925.1**
-	0.0	0.7	57.5	12.1	0.2	0.0	0.0	0.0	0.1	0.6	0.0	0.3	10.1	1.5	0.4	0.8	2.1	0.0	0.1	0.2	2.8	0.8	4.3	0.3	68.2	**7,890.9**
-	0.0	0.6	31.6	10.6	0.3	0.0	0.1	0.1	0.1	0.9	0.0	0.9	5.5	5.9	0.6	1.5	4.1	0.0	0.0	0.2	4.3	1.7	9.4	0.4	362.7	**1,325.6**
0.4	0.0	7.3	49.1	1.3	7.7	0.2	0.9	0.9	1.6	12.9	0.4	3.5	1.0	11.8	1.4	155.4	25.9	1.4	0.1	1.4	0.4	11.1	25.3	2.7	300.4	**2,226.0**
0.0	0.0	44.1	164.2	0.2	14.0	0.4	0.4	0.4	0.7	5.8	0.8	2.3	2.2	1.6	2.3	259.0	1.5	1.8	1.5	0.8	0.3	0.6	1.2	0.9	1,241.4	**3,669.6**
0.0	0.0	0.4	47.3	1.7	0.4	0.2	0.3	0.3	0.5	3.8	0.0	13.2	1.5	2.0	0.4	0.7	0.4	0.4	0.1	0.1	0.3	0.2	0.2	0.2	166.6	**1,010.5**
-	-	-	9.6	0.4	-	-	-	0.4	-	0.1	-	-	-	-	-	-	1.8	19.0	5.0	10.2	21.6	1.5	1.2	0.9	154.2	**716.1**
0.0	12.6	390.0	599.3	37.0	284.2	55.1	16.4	93.6	63.3	515.9	18.1	15.0	23.4	11.7	58.4	46.1	158.8	62.6	8.9	26.5	37.6	57.9	13.7	15.7	37.8	**9,401.3**
0.0	5.3	121.9	18.9	-	9.6	0.1	7.8	-	-	0.4	0.5	1.0	2.3	0.3	2.0	1.8	-	-	-	-	-	-	-	-	273.6	**1,174.0**
-	-	-	16.8	588.8	-	-	-	-	0.2	1.3	-	-	-	-	-	-	11.8	-	1.0	6.5	6.6	0.4	10.3	0.4	7,436.3	**9,093.9**
0.0	0.0	0.1	182.9	55.1	0.3	0.0	-	-	0.0	0.2	0.0	0.6	0.8	0.2	2.3	2.8	-	0.5	0.1	0.9	0.9	0.1	-	0.1	11,041.1	**11,439.0**
0.3	0.1	2.3	227.4	481.2	0.3	0.1	0.1	0.1	0.2	1.5	0.5	5.8	1.2	2.3	2.1	6.4	3.7	0.7	0.4	2.5	50.7	4.0	21.4	0.6	5,606.9	**8,277.9**
0.0	0.0	0.3	47.3	572.3	0.2	0.1	0.0	0.0	0.0	0.4	0.1	1.2	0.1	0.1	0.2	4.9	0.6	0.0	0.0	0.8	0.4	0.2	18.7	0.1	4,317.1	**5,072.4**
0.1	0.0	47.3	205.1	0.6	0.8	0.5	0.1	0.1	0.1	1.0	0.2	0.7	55.0	0.5	1.2	8.5	13.4	1.3	2.3	5.1	2.6	1.4	7.9	0.3	1,263.8	**1,808.1**
0.0	0.0	1,507.0	73.3	0.4	0.3	0.0	0.1	0.1	0.3	2.0	0.2	0.4	26.9	0.1	85.8	6.8	3.1	0.4	3.3	4.9	2.2	0.3	1.7	20.0	1,478.5	**4,125.1**
0.3	0.1	39.8	194.8	6.9	3.8	1.9	1.0	1.0	1.7	13.8	0.8	6.6	94.7	0.4	27.4	239.6	1.4	0.9	1.8	4.0	2.3	10.6	0.6	0.4	1,501.1	**2,965.8**
0.0	1.7	57.2	754.1	39.6	13.2	4.8	3.6	3.7	6.4	51.3	87.5	146.4	42.3	21.9	100.8	577.8	69.1	7.1	21.8	37.5	16.5	44.7	76.1	77.8	831.9	**3,747.8**
3.5	0.8	50.2	262.5	5.0	25.8	4.5	3.1	3.2	5.5	43.8	1.4	2.3	4.7	5.0	5.1	22.5	9.0	4.5	3.6	5.8	29.8	28.5	4.9	16.2	828.1	**5,428.3**
1.8	1.9	292.1	447.5	32.8	0.6	4.0	0.5	0.5	0.8	6.5	5.7	7.4	46.7	5.6	19.0	104.4	18.2	6.0	4.3	11.3	52.1	52.0	6.1	37.4	1,702.0	**4,492.7**
4.8	2.7	1,278.9	86.5	2.3	13.7	4.9	0.2	0.2	0.3	2.2	3.8	1.7	27.0	20.8	72.8	5.1	1.0	0.5	3.0	2.1	0.2	3.0	0.3	4.1	249.0	**2,539.8**
5.4	0.7	89.0	610.4	27.5	1.1	0.6	0.2	0.3	0.4	3.5	0.7	19.7	3.2	1.3	70.4	26.7	1.8	0.9	5.0	3.5	0.8	4.6	6.4	0.8	1,506.4	**4,329.9**
2.4	4.2	527.1	585.8	57.8	3.2	1.5	2.6	2.7	4.6	37.1	9.9	23.5	173.3	12.0	40.7	20.4	38.5	13.5	6.1	11.5	6.8	1.7	6.8	1.4	976.3	**5,664.9**
1.2	3.6	556.5	475.9	38.6	27.6	22.3	22.4	23.1	39.7	316.8	190.6	13.1	33.0	48.9	65.8	104.9	156.0	82.4	26.1	88.2	73.6	10.9	71.3	22.1	6,334.2	**10,230.1**
1.5	0.1	84.1	52.1	19.7	0.2	0.4	0.1	0.1	0.1	0.8	0.4	1.1	67.4	2.6	1.7	3.3	3.1	3.8	2.3	1.9	0.9	1.2	2.2	5.5	1,389.6	**1,766.5**
37.5	2.5	55.6	473.8	178.0	6.8	3.4	10.6	0.6	6.7	53.2	54.7	41.7	6.1	9.3	64.8	87.2	84.8	101.7	31.7	107.7	37.7	54.5	62.7	20.8	2,810.4	**10,223.2**
244.9	0.1	2.7	47.0	3.2	0.0	0.0	0.2	0.2	0.3	2.5	-	0.0	271.7	-	0.4	0.0	2.5	49.6	0.0	0.0	1.3	2.2	0.0	-	21.5	**730.1**
1.7	236.4	56.5	4.2	0.9	0.7	0.1	0.1	0.1	0.1	1.1	0.6	26.3	3.8	0.3	0.5	11.8	54.3	116.6	6.4	4.2	21.1	44.8	0.6	66.4	13.9	**789.2**
0.1	12.7	6,966.5	105.3	3.4	14.4	10.0	4.5	4.6	7.9	63.2	112.5	82.6	1,902.9	11.6	40.5	34.6	528.8	1,007.8	30.3	194.4	45.5	135.0	155.0	89.0	18,049.1	**31,253.5**
-	17.6	980.6	2,589.4	509.2	375.9	110.8	16.0	18.2	29.4	234.8	148.5	174.4	365.5	104.5	116.9	486.2	231.3	50.1	54.4	75.7	188.0	119.7	65.2	6.1	33,171.5	**44,084.4**
0.0	0.5	25.8	80.0	14.4	4.6	0.9	4.0	4.1	7.0	55.8	2.9	17.3	3.9	3.3	20.1	32.8	171.2	10.8	31.3	53.1	29.7	86.4	31.0	21.1	6,514.4	**7,284.9**
1.3	6.2	85.2	1,207.1	2.7	1,429.8	7.8	9.7	9.9	17.1	136.7	52.7	19.7	3.1	23.5	22.0	94.6	35.7	18.2	3.3	8.5	3.6	12.7	29.5	34.8	326.3	**6,165.4**
0.0	0.1	5.6	10.9	3.8	14.3	12.3	0.9	0.9	1.5	12.0	1.0	12.0	0.3	2.7	24.3	31.0	15.9	0.6	17.6	20.8	5.8	22.0	18.9	18.1	713.4	**979.7**
-	-	4.0	27.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	189.2	**616.4**
1.4	2.1	2.9	-	14.9	121.0	21.7	74.1	-	1.3	14.0	24.6	6.6	-	-	-	-	-	-	-	-	-	-	-	-	113.9	**654.5**
-	-	4.3	117.9	-	14.0	-	3.4	5.2	26.3	207.6	10.6	10.9	1.3	5.8	19.5	38.6	20.5	2.3	0.6	4.3	1.3	2.6	9.2	4.3	545.7	**1,162.3**
0.3	0.5	34.5	932.3	3.7	139.9	5.3	45.3	41.2	208.0	1,641.9	89.7	87.8	10.0	46.1	154.1	304.8	161.9	18.3	4.7	33.9	10.2	20.3	72.4	33.8	4,285.8	**9,311.4**
0.1	5.5	187.8	864.2	45.2	253.2	20.9	8.0	8.2	14.2	113.0	1,635.4	328.0	36.3	36.6	252.3	461.9	262.2	81.7	16.0	102.6	45.6	97.6	176.9	90.3	3,269.3	**9,197.5**
3.0	7.7	249.8	2,512.9	168.5	155.3	49.0	40.9	42.0	72.3	577.7	167.0	6,700.9	1,250.0	267.9	413.9	1,085.3	575.4	126.6	26.1	148.1	121.6	322.7	407.0	340.6	4,323.5	**22,595.0**
0.0	2.5	105.3	1,077.5	75.1	48.2	8.1	6.3	6.4	11.0	88.2	56.9	222.1	1,258.7	39.1	120.9	299.9	296.5	15.1	6.6	36.3	16.3	147.1	183.9	62.7	21,707.1	**26,470.0**
3.2	5.0	37.9	175.4	13.6	64.4	25.7	40.9	42.1	72.4	577.8	19.2	68.8	31.2	179.6	94.1	136.0	98.8	84.5	2.3	30.2	26.7	44.1	56.8	38.4	690.5	**3,052.8**
3.1	2.5	286.4	933.2	45.0	8.5	10.9	8.6	8.8	15.2	121.2	155.3	865.2	17.3	47.1	1,536.9	643.0	464.9	271.8	9.1	26.9	86.2	131.3	246.6	90.8	2,664.7	**10,904.4**
10.9	14.4	749.9	4,017.0	321.7	137.6	52.1	29.2	30.0	51.6	412.1	559.6	1,346.7	312.4	240.1	852.1	2,776.6	1,022.7	264.6	88.5	304.4	232.6	501.4	773.0	586.2	1,877.4	**21,208.9**
0.1	1.5	36.1	159.9	14.3	18.1	3.2	1.5	1.5	2.6	20.6	10.9	89.2	40.2	9.3	34.4	58.4	101.4	7.0	22.7	8.7	24.1	52.8	26.1	22.9	11,366.4	**12,372.2**
-	11.4	8.7	11.9	0.6	10.8	0.3	0.2	0.2	0.4	3.0	1.7	12.1	7.0	3.1	16.6	73.1	16.0	101.1	40.9	5.8	7.1	13.6	250.8	14.2	4,790.6	**5,503.7**
0.0	0.1	4.8	20.7	2.1	1.3	0.7	0.6	0.6	1.1	8.4	4.8	6.2	5.6	1.7	8.7	17.2	20.8	6.1	11.8	23.8	7.3	7.1	18.0	16.6	4,207.7	**4,450.3**
0.0	0.0	10.1	16.2	1.3	0.8	0.6	0.3	0.3	0.6	4.6	8.6	8.3	3.2	2.2	20.6	72.8	41.2	1.4	8.7	66.8	6.2	27.4	4.5	46.5	4,392.2	**4,779.9**
0.0	0.0	0.6	3.4	0.2	1.1	0.0	0.1	0.1	0.1	0.9	0.5	0.9	0.2	0.2	5.3	2.8	16.9	0.1	0.1	1.2	2.1	7.3	0.5	1.0	6,961.2	**7,009.8**
0.1	0.1	5.4	26.5	1.3	3.0	1.1	0.8	0.8	1.4	11.0	1.9	20.7	5.9	5.1	17.3	24.5	86.9	20.2	9.7	12.6	182.5	789.4	44.2	7.4	7,222.1	**8,640.5**
0.1	0.7	23.3	471.1	36.5	7.0	2.6	3.3	3.4	5.9	47.1	136.7	65.9	17.0	23.5	46.1	841.6	56.1	93.6	42.6	24.8	5.6	23.1	1,030.5	54.1	5,732.3	**9,194.2**
0.0	0.2	41.8	117.5	6.3	30.7	1.8	0.7	0.7	1.2	9.6	9.0	32.0	83.2	5.2	33.8	208.0	64.6	156.4	21.6	29.8	59.3	61.8	78.3	300.7	3,267.7	**4,949.6**
5.6	5.6	6,592.2	2,845.4	352.1	140.0	86.5	48.6	59.5	90.8	729.5	440.8	217.3	416.8	253.1	457.4	1,221.9	506.6	99.4	132.5	211.4	588.3	467.1	800.6	338.0	30,674.3	**59,449.8**
89.4	185.1	5,047.5	11,184.4	1,906.8	1,179.7	339.6	143.1	115.2	229.3	1,856.6	1,292.0	4,195.3	712.2	347.2	4,022.8	5,735.8	6,050.6	1,599.9	3,409.2	2,679.5	4,541.5	3,256.3	1,814.9	1,709.5	-	**81,942.6**
302.5	224.4	4,171.2	7,563.4	1,188.0	927.5	222.2	83.1	118.8	144.6	1,166.4	3,794.8	6,098.0	16,045.5	1,136.8	1,883.3	4,742.4	695.2	957.6	304.5	299.0	349.6	1,930.5	2,155.0	672.7	-	**77,914.8**
3.1	9.7	368.9	531.3	166.8	648.0	-119.8	-28.5	-	14.9	115.5	82.9	1,569.2	3,021.7	84.7	56.7	78.3	156.7	32.5	20.1	38.3	7.1	19.9	371.7	53.4	12,781.7	**24,644.0**
730.1	**789.2**	**31,253.5**	**44,084.4**	**7,284.9**	**6,165.4**	**979.7**	**616.4**	**654.5**	**1,162.3**	**9,311.4**	**9,197.5**	**22,595.0**	**26,470.0**	**3,052.8**	**10,904.4**	**21,208.9**	**12,372.2**	**5,503.7**	**4,450.3**	**4,779.9**	**7,009.8**	**8,640.5**	**9,194.2**	**4,949.6**	**243,951.2**	**625,932.7**

C.2. I-O Table for the Closed Economy

Table C.2: 2009 National I-O table for the Closed Economy (Million NZD)

Industries		1 HFRG	2 SBLC	3 DAIF	4 OTHF	5 SAHF	6 FOLO	7 FISH	8 COAL	9 FUEL	10 OMIN	11 MEAT	12 DAIR	13 OFOD	14 BEVT	15 TCFL	16 WOOD	17 PAPR	18 PPRM	19 CHEM	20 RBPL	21 NMMP	22 BASM	23 FABM	24 MAEQ	25 OMFG	26 ELEC	27 WATS	28 WAST	29 CONS	30 TRDE	31 ACCR
1	HFRG	33.0	74.5	221.4	7.7	22.7	20.8	0.1	0.0	0.1	0.0	137.1	-	181.3	156.6	1.5	0.2	0.1	0.1	0.1	0.8	0.1	0.0	0.1	0.3	0.0	-	-	0.0	3.2	139.6	190.6
2	SBLC	46.0	1,097.7	443.2	64.4	45.4	21.8	0.0	0.0	0.0	0.0	3,883.4	-	107.9	48.1	90.2	1.0	0.2	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	-	-	0.0	1.5	617.5	22.9
3	DAIF	19.8	173.8	151.6	16.0	16.6	3.1	0.0	0.0	0.0	0.0	-	7,286.3	29.3	24.7	5.5	0.3	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.1	0.0	-	-	0.0	0.7	57.5	12.1
4	OTHF	36.9	111.2	89.3	62.5	31.8	3.2	0.1	0.0	0.0	0.0	460.2	31.4	40.2	11.8	5.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	-	-	0.0	0.6	31.6	10.6
5	SAHF	198.1	401.9	278.9	48.0	148.1	232.8	0.9	0.2	0.4	0.4	250.9	-	14.7	4.5	1.6	2.3	0.8	0.5	6.9	1.7	1.4	0.8	0.7	3.9	0.2	0.7	0.4	0.0	7.3	49.1	1.3
6	FOLO	8.9	32.8	59.3	4.8	1.5	698.4	0.9	0.7	0.2	1.2	47.2	-	1.5	5.8	2.6	893.5	139.2	2.3	5.6	0.6	0.9	0.7	2.5	5.8	3.3	0.9	0.0	0.0	44.1	164.2	0.2
7	FISH	0.2	0.2	0.5	0.0	0.9	0.7	121.6	0.2	0.6	0.4	0.1	-	642.0	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.2	0.9	0.2	0.0	0.0	0.4	47.3	1.7
8	COAL	-	-	17.9	-	-	-	-	2.2	14.0	13.6	6.6	23.1	16.7	1.8	2.4	8.5	3.7	0.6	-	2.5	24.6	207.7	-	-	-	144.9	-	-	-	9.7	0.4
9	FUEL	20.1	114.4	110.7	39.6	86.0	135.8	42.6	122.5	3,716.3	149.3	55.9	68.5	120.2	35.9	32.9	75.2	69.7	192.2	637.8	53.1	42.5	40.3	61.1	110.7	31.8	651.7	0.0	12.6	390.0	599.4	37.0
10	OMIN	9.7	39.9	54.9	6.2	1.1	2.1	0.6	46.2	135.3	107.9	-	-	-	-	-	-	-	-	8.3	17.0	166.6	100.6	23.2	3.7	8.8	-	0.0	5.3	121.9	18.9	-
11	MEAT	4.4	20.1	89.7	14.3	2.7	1.0	3.6	4.1	0.1	6.8	548.2	-	45.4	-	167.4	-	-	43.1	-	62.5	-	-	-	-	-	-	-	-	-	16.8	588.8
12	DAIR	-	-	-	-	-	-	-	-	1.4	-	-	101.4	6.4	3.7	-	11.5	3.2	1.5	2.5	4.7	1.9	0.3	2.1	7.0	2.5	0.1	0.0	0.0	0.1	182.9	55.1
13	OFOD	8.5	48.4	198.1	30.5	6.9	2.4	48.3	0.7	1.0	1.2	57.9	42.7	1,224.0	113.9	2.6	9.3	5.2	12.0	5.4	14.6	2.0	1.1	5.5	9.9	2.7	0.4	0.3	0.1	2.3	227.4	481.2
14	BEVT	0.6	0.4	0.4	0.2	0.2	0.2	0.1	0.0	0.1	0.0	0.3	0.2	7.2	91.6	0.3	0.5	0.2	1.1	0.3	0.6	0.2	0.2	0.6	1.2	0.2	0.1	0.0	0.0	0.3	47.3	572.3
15	TCFL	1.5	1.4	7.3	0.3	2.8	3.4	1.1	0.0	0.5	0.0	1.3	1.0	4.7	3.6	103.2	7.5	1.9	16.0	0.6	2.9	0.9	2.4	5.2	11.5	7.0	0.2	0.1	0.0	47.4	205.1	0.6
16	WOOD	0.9	2.9	4.1	0.6	0.1	14.8	0.1	0.2	0.5	0.3	0.9	0.6	1.1	8.3	0.9	520.6	46.9	8.4	0.5	5.1	31.2	4.1	15.7	16.7	221.1	0.3	0.0	0.0	1,507.4	73.3	0.4
17	PAPR	47.1	4.2	4.4	4.5	1.8	2.6	0.2	0.9	1.4	1.4	5.0	3.7	11.0	25.5	1.0	26.0	386.9	175.2	4.7	47.6	11.8	2.7	1.8	11.9	7.9	16.9	0.3	0.1	39.9	194.8	6.9
18	PPRM	3.5	10.3	4.2	3.9	9.9	4.2	0.6	0.4	8.5	0.6	24.0	17.7	62.8	38.9	10.3	24.2	43.3	203.4	12.7	40.1	12.1	5.9	33.4	50.0	14.8	13.3	0.0	1.7	57.2	754.2	39.6
19	CHEM	119.3	474.8	768.3	71.4	77.5	77.4	2.5	2.7	35.9	4.5	37.4	26.5	34.1	9.4	6.9	148.0	90.3	15.2	1,338.9	508.5	14.9	11.9	66.0	82.3	19.2	6.1	3.5	0.8	50.2	262.5	5.0
20	RBPL	57.2	86.5	152.2	26.1	9.7	24.8	1.9	1.5	10.0	2.5	160.7	118.5	223.5	21.8	9.6	48.1	19.3	71.5	44.0	321.7	6.8	6.4	57.5	115.9	26.6	1.3	1.8	1.9	292.2	447.5	32.8
21	NMMP	2.9	9.8	14.3	1.8	1.2	1.8	0.3	5.8	30.0	9.6	0.9	0.6	7.4	62.1	0.3	4.3	0.8	2.9	0.8	4.6	379.2	9.4	35.6	155.2	7.9	0.1	4.8	2.7	1,279.2	86.5	2.3
22	BASM	0.8	3.8	3.4	0.5	6.6	21.2	0.1	1.5	15.6	2.5	35.0	25.8	27.7	13.4	7.0	34.9	34.1	21.5	29.9	26.2	37.3	393.0	661.0	468.3	65.0	2.8	5.4	0.7	89.0	610.4	27.5
23	FABM	16.1	50.5	68.7	9.4	10.3	27.9	6.9	3.5	17.5	5.8	48.5	35.7	86.2	218.5	13.1	43.8	38.9	17.8	37.3	62.0	35.5	225.7	1,028.5	900.6	65.7	19.8	2.4	4.2	527.3	585.8	57.8
24	MAEQ	10.2	35.5	62.8	6.2	58.2	12.3	60.0	2.2	97.6	3.7	13.1	9.7	24.5	22.7	7.8	10.0	11.7	18.1	21.8	13.7	6.5	30.4	60.1	689.8	8.4	86.5	1.2	3.6	556.6	475.9	38.6
25	OMFG	0.6	1.9	2.9	0.4	0.3	2.5	0.1	0.2	0.4	0.4	1.0	0.8	2.6	8.6	0.6	2.5	1.1	3.7	0.6	3.2	1.5	4.5	13.4	25.0	41.4	0.3	1.5	0.1	84.1	52.1	19.7
26	ELEC	70.2	45.2	123.6	23.0	4.0	9.8	6.0	7.5	49.6	38.0	128.9	68.7	84.9	20.5	13.7	89.9	220.0	24.8	79.9	44.5	46.9	371.0	39.6	60.1	12.6	4,138.2	37.5	2.5	55.6	473.9	178.0
27	WATS	-	-	-	-	4.8	0.1	2.7	0.2	1.2	0.3	38.8	11.7	4.2	11.2	0.9	-	0.1	-	-	-	-	-	-	1.6	-	1.9	244.9	0.1	2.7	47.0	3.2
28	WAST	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	14.3	17.8	14.5	0.1	1.1	30.9	0.1	3.6	10.7	2.3	0.1	1.1	0.2	16.1	1.4	1.2	1.7	236.4	56.6	4.2	0.9
29	CONS	22.9	75.2	104.5	14.6	5.4	27.9	7.9	67.2	238.0	111.4	3.1	2.3	4.5	8.6	4.5	14.8	18.7	3.2	3.1	5.7	50.3	3.9	23.9	234.3	5.2	585.3	0.1	12.7	6,968.1	105.3	3.4
30	TRDE	108.7	349.5	540.5	68.7	103.4	106.6	39.5	15.7	60.0	26.0	181.4	133.8	427.0	166.4	108.9	108.1	111.5	94.0	117.1	53.8	36.1	172.2	168.0	450.6	47.5	51.4	-	17.6	980.8	2,589.5	509.2
31	ACCR	2.2	4.3	5.1	1.2	2.7	2.9	0.1	0.6	2.5	1.0	1.8	1.4	3.3	1.9	1.3	1.7	0.7	2.4	1.8	3.0	1.2	1.0	3.3	7.5	1.2	2.3	0.0	0.5	25.8	80.0	14.4
32	RDFR	55.5	100.0	52.1	30.0	29.9	429.4	10.9	12.4	17.2	20.6	211.6	217.7	265.2	62.7	26.9	137.8	57.7	59.5	271.1	79.2	85.4	125.4	65.8	108.0	29.1	3.3	1.3	6.2	85.2	1,207.2	2.7
33	RDPS	0.5	1.2	1.1	0.6	0.6	0.6	0.2	0.1	0.1	0.1	0.8	0.6	0.9	0.4	0.1	0.4	0.2	0.3	0.7	0.4	0.5	0.2	0.3	1.3	0.2	0.5	0.0	0.1	5.6	10.9	3.8
34	RFRT	3.4	8.4	6.1	2.1	-	28.4	-	52.0	-	20.9	42.2	15.5	25.3	7.8	5.5	13.1	26.2	11.4	50.7	15.2	10.1	14.7	14.2	17.1	5.7	-	-	-	4.0	27.5	-
35	WFRT	-	-	-	-	-	6.9	2.4	4.4	60.4	30.8	46.0	-	11.5	5.6	-	9.5	28.5	-	9.2	-	25.7	10.7	2.6	3.1	-	-	1.4	2.1	2.9	-	14.9
36	OFRT	1.4	2.3	1.7	0.9	2.0	7.6	3.9	0.4	2.6	-	15.5	1.9	15.7	2.1	1.5	5.3	8.8	3.1	8.5	4.1	0.7	2.6	2.4	8.6	1.6	1.1	-	-	4.3	117.9	-
37	OTTR	11.0	18.6	13.6	6.9	15.4	63.6	31.4	7.4	35.6	8.8	136.2	16.0	128.5	18.3	12.2	44.8	77.9	25.3	72.4	33.6	12.3	24.2	20.4	69.9	12.7	8.4	0.3	0.5	34.6	932.4	3.7
38	COMM	38.6	71.6	48.6	35.2	18.7	29.1	6.4	3.9	13.0	6.5	31.5	23.3	47.3	20.0	10.6	25.2	18.1	48.5	34.3	43.3	17.9	14.7	38.4	97.7	13.1	29.6	0.1	5.5	187.8	864.2	45.2
39	FIIN	172.7	237.9	142.6	70.0	94.5	117.7	76.2	6.9	55.9	11.5	71.4	52.7	143.8	158.1	28.7	85.6	41.1	81.7	78.3	79.3	35.5	187.5	84.8	155.2	29.2	141.8	3.0	7.7	249.9	2,513.0	168.5
40	HOUS	28.6	62.1	98.0	2.7	8.6	8.9	1.3	0.8	6.4	1.3	22.5	16.6	29.0	11.4	12.3	15.3	4.1	23.9	13.1	23.1	8.7	6.9	39.8	57.2	15.4	54.3	0.0	2.5	105.3	1,077.6	75.1
41	EHOP	24.6	28.1	23.7	6.0	16.3	26.1	17.9	6.3	7.0	10.4	13.6	10.0	34.0	5.3	3.1	17.1	5.4	17.0	24.2	10.8	5.7	5.9	12.4	31.0	4.7	27.2	3.2	5.0	37.9	175.4	13.6
42	SRCS	36.1	66.0	45.2	8.7	39.3	41.7	16.5	6.7	177.9	11.1	89.8	66.3	75.8	82.8	10.1	23.2	87.1	41.8	85.9	51.1	34.1	52.3	80.3	228.2	12.7	737.0	3.1	2.5	286.5	933.3	45.0
43	OBUS	123.2	257.1	172.7	106.2	61.0	185.0	35.2	10.0	77.9	16.6	168.6	124.4	341.2	264.0	63.4	140.9	55.8	180.2	118.9	207.1	83.1	54.6	163.2	352.5	58.7	224.6	10.9	14.4	750.0	4,017.2	321.7
44	GOVC	12.4	50.5	41.6	6.8	3.9	13.8	3.9	0.8	2.1	1.4	3.9	2.9	7.0	3.0	1.9	29.0	4.9	4.7	3.3	4.2	5.7	1.8	6.5	10.5	6.1	5.5	0.1	1.5	36.1	160.0	14.3
45	GOVL	0.2	0.6	0.3	0.1	0.4	1.6	0.1	15.7	0.5	26.0	1.8	1.3	2.6	1.3	0.8	2.4	0.5	1.7	1.3	0.9	37.6	0.4	1.0	3.3	0.3	-	-	11.4	8.7	11.9	0.6
46	SCHL	1.1	3.0	3.4	0.8	0.5	1.3	0.2	0.2	1.0	0.3	0.8	0.6	1.8	1.0	0.7	5.1	0.5	7.3	0.6	1.7	0.4	0.3	3.4	3.2	0.5	6.9	0.0	0.1	4.8	20.7	2.1
47	OEDU	0.8	0.8	0.4	0.6	0.6	2.1	0.1	0.0	0.6	0.1	0.6	0.4	1.2	0.8	0.2	9.3	0.2	0.6	0.5	2.0	0.3	0.1	0.8	1.6	0.2	9.7	0.0	0.0	10.1	16.2	1.3
48	HOSP	0.1	0.2	0.3	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.0	0.1	0.3	0.0	0.2	0.0	0.0	0.6	3.4	0.2
49	OHCS	3.1	26.6	72.6	2.2	2.5	1.0	0.2	0.1	0.3	0.1	1.4	1.0	1.2	3.5	0.3	2.3	3.5	2.6	0.5	1.6	2.2	0.4	2.2	4.1	0.2	2.7	0.1	0.1	5.4	26.5	1.3
50	CULT	13.9	29.5	20.8	7.4	11.7	3.2	0.2	0.3	2.5	0.5	24.0	17.7	49.7	28.2	5.2	9.8	4.1	45.4	9.4	36.8	13.4	3.6	11.4	34.5	5.8	10.4	0.1	0.7	23.3	471.1	36.5
51	PERS	2.0	4.2	11.2	0.9	9.9	14.5	5.0	0.2	1.5	0.3	78.7	58.0	16.1	13.7	9.3	1.8	0.7	26.7	4.9	6.5	1.7	0.9	10.8	16.0	1.3	30.8	0.0	0.2	41.9	117.5	6.3
52	Household	966.6	1,378.8	1,572.0	242.8	890.7	461.2	136.5	55.3	193.0	190.3	1,372.7	514.7	1,126.4	427.1	455.5	714.4	398.1	915.3	236.8	721.1	485.7	451.1	1,106.1	2,346.8	387.0	559.4	89.5	185.1	5,048.7	11,185.0	1,906.8
Other Imports		232.1	706.9	438.7	126.6	123.4	166.1	168.1	5.6	-	24.7	365.5	330.8	1,355.1	426.9	367.2	202.3	289.5	678.0	898.9	1,243.0	221.3	294.8	888.0	1,765.4	289.6	61.6	5.6	5.6	6,593.6	2,845.5	352.1
Depreciation + Op Surplus		435.1	336.5	1,287.2	101.5	222.3	572.9	146.2	209.8	2,722.5	285.7	238.0	1,873.1	1,097.1	722.6	184.8	493.8	583.6	608.2	1,100.9	586.4	502.4	1,459.5	762.1	1,447.3	279.4	2,536.3	302.5	224.4	4,172.1	7,563.8	1,188.0
Net Indirect Taxes		63.4	262.9	254.6	39.6	10.8	23.8	-0.9	30.1	1,776.3	20.3	12.6	63.7	40.5	1,665.8	4.6	19.4	20.8	29.6	33.4	37.3	38.5	20.4	39.9	29.9	9.8	47.7	3.1	9.7	369.0	531.4	166.8
Gross Output		**3,076.5**	**6,925.1**	**7,891.0**	**1,325.6**	**2,226.1**	**3,669.8**	**1,010.5**	**716.5**	**9,593.2**	**1,177.2**	**9,094.0**	**11,439.0**	**8,278.0**	**5,072.4**	**1,808.1**	**4,125.6**	**2,966.0**	**3,748.4**	**5,429.5**	**4,493.1**	**2,540.9**	**4,330.6**	**5,665.9**	**10,232.6**	**1,766.6**	**10,225.5**	**730.2**	**789.3**	**31,260.6**	**44,086.7**	**7,285.0**

Table C.2: 2009 National I-O table for the Closed Economy (Million NZD) – Continuation (right hand side)

32 RDFR	33 RDPS	34 RFRT	35 WFRT	36 OFRT	37 OTTR	38 COMM	39 FIIN	40 HOUS	41 EHOP	42 SRCS	43 OBUS	44 GOVC	45 GOVL	46 SCHL	47 OEDU	48 HOSP	49 OHCS	50 CULT	51 PERS	52 Household	Government Consumption	Stock Change	Gross Investment	Exports	Import Adjustments	Final Demand	Gross Output
0.2	0.0	0.1	0.1	0.1	0.8	0.1	1.6	10.6	1.8	3.3	6.7	3.5	0.1	0.1	0.4	38.8	1.3	2.9	0.5	444.2	8.3	-3.9	9.9	1,353.0	-0.0	1,367.3	**3,076.5**
1.0	0.0	0.1	0.1	0.2	2.0	0.0	0.6	4.1	5.0	3.9	1.9	3.0	0.0	0.1	0.2	3.4	1.0	17.6	0.3	67.2	1.3	1.7	4.5	314.2	-0.0	321.6	**6,925.1**
0.2	0.0	0.0	0.0	0.1	0.6	0.0	0.3	10.1	1.5	0.4	0.8	2.1	0.0	0.1	0.2	2.8	0.8	4.3	0.3	17.0	5.9	0.4	4.7	40.1	-	51.1	**7,891.0**
0.3	0.0	0.1	0.1	0.1	0.9	0.0	0.9	5.5	5.9	0.6	1.5	4.1	0.0	0.0	0.2	4.3	1.7	9.4	0.4	162.1	7.1	0.8	5.5	187.3	-0.0	200.6	**1,325.6**
7.7	0.2	0.9	0.9	1.6	12.9	0.4	3.5	1.0	11.8	1.4	155.4	25.9	1.4	0.1	1.4	0.4	11.1	25.3	2.7	24.7	13.9	0.4	200.2	61.2	-0.0	275.7	**2,226.1**
14.0	0.4	0.4	0.4	0.7	5.8	0.8	2.3	2.2	1.6	2.3	259.0	1.5	1.8	1.5	0.8	0.3	0.6	1.2	0.9	59.6	3.1	314.9	39.4	824.4	-0.0	1,181.8	**3,669.8**
0.4	0.2	0.3	0.3	0.5	3.8	0.0	13.2	1.5	2.0	0.4	0.7	0.4	0.4	0.1	0.1	0.3	0.2	0.2	0.2	2.1	0.1	8.9	0.6	155.0	-0.1	164.5	**1,010.5**
-	-	-	0.4	-	0.1	-	-	-	-	-	-	1.8	19.0	5.0	10.2	21.6	1.5	1.2	0.9	13.2	0.5	-	24.9	115.6	-	141.0	**716.5**
284.3	55.1	16.4	93.8	63.3	516.0	18.1	15.0	23.4	11.7	58.4	46.1	158.8	62.6	8.9	26.5	37.6	57.9	13.7	15.7	1,651.3	40.5	-27.7	1,074.9	2,397.9	-4,983.0	-1,497.4	**9,593.2**
9.6	0.1	7.8	-	-	0.4	0.5	1.0	2.3	0.3	2.0	1.8	-	-	-	-	-	-	-	-	5.2	2.3	0.0	20.7	256.7	-11.3	268.4	**1,177.2**
-	-	-	-	0.2	1.3	-	-	-	-	-	-	11.8	-	1.0	6.5	6.6	0.4	10.3	0.4	2,324.9	55.4	-	7.6	5,048.5	-0.1	5,111.4	**9,094.0**
0.3	0.0	-	-	0.0	0.2	0.0	0.6	0.8	0.2	2.3	2.8	-	0.5	0.1	0.9	0.9	0.1	-	0.1	1,252.4	21.7	-175.8	10.2	9,932.7	-	9,788.7	**11,439.0**
0.3	0.1	0.1	0.1	0.2	1.5	0.5	5.8	1.2	2.3	2.1	6.4	3.7	0.7	0.4	2.5	50.7	4.0	21.4	0.6	2,611.7	16.7	-6.4	23.1	2,961.9	-0.2	2,995.2	**8,278.0**
0.2	0.1	0.0	0.0	0.0	0.4	0.1	1.2	0.1	0.1	0.2	4.9	0.6	0.0	0.0	0.8	0.4	0.2	18.7	0.1	2,916.7	54.5	16.9	3.0	1,326.2	-0.0	1,400.5	**5,072.4**
0.8	0.5	0.1	0.1	0.1	1.0	0.2	0.7	55.0	0.5	1.2	8.5	13.4	1.3	2.3	5.1	2.6	1.4	7.9	0.3	438.5	7.1	23.2	7.8	787.5	-0.3	825.3	**1,808.1**
0.3	0.0	0.1	0.1	0.3	2.0	0.2	0.4	26.9	0.1	85.9	6.8	3.1	0.4	3.3	4.9	2.2	0.3	1.7	20.0	37.5	7.7	28.4	32.4	1,372.4	-0.0	1,441.0	**4,125.6**
3.8	1.9	1.0	1.0	1.7	13.8	0.8	6.6	94.7	0.4	27.4	239.6	1.4	0.9	1.8	4.0	2.3	10.6	0.6	0.4	323.2	8.1	1.5	2.4	1,166.2	-0.3	1,177.9	**2,966.0**
13.2	4.8	3.6	3.7	6.4	51.3	87.5	146.5	42.3	21.9	100.9	577.9	69.1	7.1	21.8	37.5	16.5	44.7	76.2	77.8	504.0	9.7	15.4	22.5	282.0	-1.8	327.9	**3,748.4**
25.8	4.5	3.1	3.2	5.5	43.8	1.4	2.3	4.7	5.0	5.1	22.5	9.0	4.5	3.6	5.8	29.8	28.5	4.9	16.2	98.9	1.8	6.7	5.9	719.9	-5.1	729.2	**5,429.5**
0.6	4.0	0.5	0.5	0.8	6.5	5.7	7.4	46.7	5.6	19.1	104.4	18.2	6.0	4.3	11.3	52.1	52.0	6.1	37.4	571.4	124.0	2.4	93.5	915.7	-5.0	1,130.6	**4,493.1**
13.7	4.9	0.2	0.2	0.3	2.2	3.8	1.7	27.0	20.8	72.8	5.1	1.0	0.5	3.0	2.1	0.2	3.0	0.3	4.1	50.9	1.2	0.3	26.8	175.1	-5.2	198.1	**2,540.9**
1.1	0.6	0.2	0.3	0.4	3.5	0.7	19.7	3.2	1.3	70.5	26.7	1.8	0.9	5.0	3.5	0.8	4.6	6.4	0.8	28.5	0.9	1.1	37.3	1,440.2	-1.6	1,477.9	**4,330.6**
3.2	1.5	2.6	2.7	4.6	37.1	9.9	23.5	173.3	12.0	40.7	20.4	38.5	13.5	6.1	11.5	6.8	1.7	6.8	1.4	127.7	4.7	45.9	227.7	574.1	-3.7	848.5	**5,665.9**
27.6	22.3	22.5	23.1	39.7	316.8	190.6	13.1	33.0	48.9	65.8	104.9	156.0	82.4	26.1	88.2	73.6	10.9	71.3	22.1	857.3	4.4	76.2	2,188.9	3,261.8	-54.4	5,476.9	**10,232.6**
0.2	0.4	0.1	0.1	0.1	0.8	0.4	1.1	67.4	2.6	1.7	3.3	3.1	3.8	2.3	1.9	0.9	1.2	2.2	5.5	495.0	8.9	46.6	455.8	383.4	-0.2	894.5	**1,766.6**
6.8	3.4	10.6	0.6	6.7	53.2	54.7	41.7	6.1	9.3	64.9	87.2	84.8	101.7	31.7	107.7	37.7	54.5	62.7	20.8	2,474.9	48.6	0.0	261.2	25.7	-	335.5	**10,225.5**
0.0	0.0	0.2	0.2	0.3	2.5	-	0.0	271.7	-	0.4	0.0	2.5	49.6	0.0	0.0	1.3	2.2	0.0	-	1.5	0.7	-	19.0	0.2	-0.0	19.9	**730.2**
0.7	0.1	0.1	0.1	0.1	1.1	0.6	26.3	3.8	0.3	0.5	11.8	54.3	116.6	6.4	4.2	21.1	44.8	0.6	66.4	11.6	1.0	0.0	1.2	0.0	-	2.2	**789.3**
14.4	10.0	4.5	4.6	7.9	63.2	112.5	82.7	1,902.9	11.6	40.5	34.7	528.8	1,007.8	30.3	194.4	45.5	135.0	155.0	89.0	207.8	7.8	5.9	17,629.2	198.7	-0.3	17,841.3	**31,260.6**
376.0	110.8	16.0	18.2	29.4	234.8	148.5	174.4	365.5	104.5	116.9	486.3	231.3	50.1	54.4	75.7	188.0	119.7	65.2	6.1	18,843.7	679.6	537.1	4,132.0	8,982.4	-3.3	14,327.8	**44,086.7**
4.6	0.9	4.0	4.1	7.0	55.8	2.9	17.3	3.9	3.3	20.2	32.9	171.2	10.8	31.3	53.1	29.7	86.4	31.0	21.1	4,347.1	81.1	4.5	9.6	2,072.0	-0.0	2,167.2	**7,285.0**
1,430.1	7.8	9.7	10.0	17.1	136.7	52.7	19.7	3.1	23.5	22.0	94.6	35.7	18.2	3.3	8.5	3.6	12.7	29.5	34.8	179.2	36.9	0.0	21.5	88.6	-	147.1	**6,166.5**
14.3	12.3	0.9	0.9	1.5	12.0	1.0	12.0	0.3	2.7	24.3	31.0	15.9	0.6	17.6	20.8	5.8	22.0	18.9	18.1	354.7	210.9	0.5	5.5	141.9	-	358.8	**979.7**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	170.9	9.3	-	9.0	-	-	18.3	**616.5**
121.0	21.7	74.2	-	1.3	14.0	24.6	6.6	-	-	-	-	-	-	-	-	-	-	-	-	79.5	7.7	-	26.7	-	-	34.4	**655.8**
14.0	-	3.4	5.2	26.3	207.6	10.6	10.9	1.3	5.8	19.5	38.6	20.5	2.3	0.6	4.3	1.3	2.6	9.2	4.3	122.8	9.1	0.5	11.9	402.8	-1.4	422.9	**1,162.5**
140.0	5.3	45.3	41.3	208.1	1,642.1	89.7	87.8	10.0	46.1	154.1	304.8	161.9	18.3	4.7	33.9	10.2	20.3	72.4	33.8	991.7	24.6	3.6	99.2	3,177.4	-10.7	3,294.1	**9,312.9**
253.3	20.9	8.0	8.2	14.2	113.0	1,635.6	328.1	36.3	36.6	252.4	461.9	262.2	81.7	16.0	102.6	45.6	97.6	176.9	90.3	2,371.0	65.0	-0.9	211.6	623.3	-0.6	898.3	**9,198.5**
155.3	49.0	40.9	42.1	72.4	577.8	167.1	6,701.9	1,250.0	268.0	414.1	1,085.5	575.4	126.6	26.1	148.1	121.6	322.7	407.0	340.6	3,460.4	88.0	0.8	237.8	538.4	-1.9	863.1	**22,598.3**
48.2	8.1	6.3	6.4	11.0	88.2	56.9	222.1	1,258.8	39.1	121.0	300.0	296.5	15.1	6.6	36.3	16.3	147.1	183.9	62.7	19,724.7	552.2	0.1	1,168.9	261.2	-0.0	1,982.4	**26,470.5**
64.4	25.7	41.0	42.1	72.4	577.9	19.2	68.8	31.2	179.6	94.1	136.0	98.8	84.5	2.3	30.2	26.7	44.1	56.8	38.4	157.3	45.6	2.2	49.2	437.3	-1.0	533.2	**3,053.3**
8.5	10.9	8.6	8.8	15.2	121.2	155.4	865.3	17.3	47.1	1,537.6	643.1	464.9	271.8	9.1	26.9	86.2	131.3	246.6	90.8	169.2	530.3	3.9	1,536.0	431.0	-5.6	2,495.6	**10,909.4**
137.7	52.1	29.2	30.1	51.6	412.2	559.6	1,346.9	312.4	240.1	852.5	2,777.1	1,022.8	264.6	88.5	304.4	232.6	501.4	773.1	586.2	561.6	240.7	0.7	330.2	749.5	-5.2	1,315.8	**21,212.7**
18.1	3.2	1.5	1.5	2.6	20.6	10.9	89.2	40.2	9.3	34.5	58.4	101.4	7.0	22.7	8.7	24.1	52.8	26.1	22.9	258.3	10,923.3	-0.5	69.0	116.4	-	11,108.1	**12,372.4**
10.8	0.3	0.2	0.2	0.4	3.0	1.7	12.1	7.0	3.1	16.6	73.1	16.0	101.1	40.9	5.8	7.1	13.6	250.8	14.2	201.5	4,486.2	-	17.4	85.4	-	4,589.1	**5,503.8**
1.3	0.7	0.6	0.6	1.1	8.4	4.8	6.2	5.6	1.7	8.7	17.2	20.8	6.1	11.8	23.8	7.3	7.1	18.0	16.6	161.2	3,914.7	0.3	4.3	127.2	-	4,046.5	**4,450.3**
0.8	0.6	0.3	0.3	0.6	4.6	8.6	8.3	3.2	2.2	20.6	72.8	41.2	1.4	8.7	66.8	6.2	27.4	4.5	46.5	1,300.1	2,111.7	0.8	39.9	939.7	-0.0	3,092.0	**4,779.9**
1.1	0.0	0.1	0.1	0.1	0.9	0.5	0.9	0.2	0.2	5.4	2.8	16.9	0.1	0.1	1.2	2.1	7.3	0.5	1.0	637.7	6,289.9	0.0	12.0	21.5	-	6,323.4	**7,009.8**
3.0	1.1	0.8	0.8	1.4	11.0	1.9	20.7	5.9	5.1	17.3	24.5	86.9	20.2	9.7	12.6	182.5	789.4	44.2	7.4	2,895.8	4,231.8	0.4	25.0	69.1	-0.0	4,326.3	**8,640.5**
7.0	2.6	3.3	3.4	5.9	47.1	136.7	65.9	17.0	23.5	46.1	841.7	56.1	93.6	42.6	24.8	5.6	23.1	1,030.5	54.1	4,468.0	371.7	1.1	45.2	846.3	-0.0	1,264.3	**9,194.6**
30.7	1.8	0.7	0.7	1.2	9.6	9.0	32.0	83.2	5.2	33.8	208.0	64.6	156.4	21.6	29.8	59.3	61.8	78.3	300.7	3,013.2	109.8	1.0	14.8	128.8	-0.0	254.4	**4,949.8**
1,179.9	339.6	143.1	115.4	229.4	1,856.9	1,292.1	4,195.9	712.2	347.3	4,024.7	5,736.9	6,050.7	1,599.9	3,409.2	2,679.5	4,541.5	3,256.4	1,815.0	1,709.6	-	-	-	-	-	-	-	**81,955.4**
140.1	86.5	48.6	59.6	90.8	729.6	440.9	217.3	416.8	253.2	457.6	1,222.2	506.6	99.4	132.5	211.4	588.3	467.1	800.6	338.0	16,231.9	400.2	386.3	8,553.7	-	5,102.2	14,442.4	**59,453.8**
927.7	222.3	83.1	119.0	144.6	1,166.6	3,795.2	6,098.9	16,045.8	1,137.0	1,884.2	4,743.2	695.2	957.6	304.5	299.1	349.6	1,930.5	2,155.1	672.7	-	-	-	-	-	-	-	**77,978.0**
648.1	-119.8	-28.5	-	14.9	115.5	82.9	1,569.5	3,021.7	84.7	56.7	78.4	156.7	32.5	20.1	38.3	7.1	19.9	371.7	53.4	9,878.1	860.8	2.4	1,022.9	1,017.5	-	2,903.6	**24,680.2**
6,166.5	**979.7**	**616.5**	**655.8**	**1,162.5**	**9,312.9**	**9,198.5**	**22,598.3**	**26,470.5**	**3,053.3**	**10,909.4**	**21,212.7**	**12,372.4**	**5,503.8**	**4,450.3**	**4,779.9**	**7,009.8**	**8,640.5**	**9,194.6**	**4,949.8**	**108,360.9**	**36,748.7**	**1,328.4**	**40,094.1**	**57,535.2**	**-**	**135,706.5**	**626,284.7**

C.3. I-O Table for the Closed Economy after the constraint

Table C.3: 2009 I-O table for the Closed Economy after the constraint (Million NZD)

	Industries	1 HFRG	2 SBLC	3 DAIF	4 OTHF	5 SAHF	6 FOLO	7 FISH	8 COAL	9 FUEL	10 OMIN	11 MEAT	12 DAIR	13 OFOD	14 BEVT	15 TCFL	16 WOOD	17 PAPR	18 PPRM	19 CHEM	20 RBPL	21 NMMP	22 BASM	23 FABM	24 MAEQ	25 OMFG	26 ELEC	27 WATS
1	HFRG	29.6	66.4	211.4	6.8	20.8	19.7	0.1	0.0	0.1	0.0	122.2	-	154.0	122.6	1.3	0.1	0.1	0.1	0.1	0.7	0.1	0.0	0.1	0.3	0.0	-	-
2	SBLC	41.3	977.6	423.2	56.8	41.5	20.6	0.0	0.0	0.0	0.0	3,459.0	-	91.7	37.6	79.2	0.9	0.1	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	-	-
3	DAIF	17.8	154.8	144.8	14.1	15.2	2.9	0.0	0.0	0.0	0.0	-	6,993.5	24.9	19.3	4.9	0.3	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.1	0.0	-	-
4	OTHF	33.1	99.1	85.3	55.1	29.1	3.0	0.0	0.0	0.0	0.0	409.9	30.1	34.2	9.2	4.4	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	-	-
5	SAHF	177.7	357.9	266.3	42.3	135.5	220.6	0.8	0.2	0.4	0.4	223.5	-	12.5	3.5	1.4	2.2	0.7	0.4	6.4	1.5	1.3	0.7	0.6	3.6	0.2	0.6	0.3
6	FOLO	8.0	29.2	56.7	4.2	1.4	661.8	0.8	0.7	0.2	1.2	42.0	-	1.3	4.6	2.3	856.4	125.1	2.0	5.1	0.5	0.9	0.6	2.3	5.4	2.9	0.7	0.0
7	FISH	0.2	0.2	0.5	0.0	0.8	0.6	106.6	0.2	0.6	0.4	0.1	-	545.3	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.2	0.8	0.1	0.0
8	COAL	-	-	17.1	-	-	-	-	2.0	13.7	12.9	5.9	22.2	14.2	1.4	2.1	8.1	3.3	0.5	-	2.2	23.0	193.3	-	-	-	117.3	-
9	FUEL	18.0	101.9	105.7	34.9	78.6	128.7	37.3	112.2	3,642.0	141.9	49.8	65.8	102.1	28.1	28.9	72.1	62.6	162.6	586.4	47.2	39.7	37.5	55.4	103.6	28.0	527.5	0.0
10	OMIN	8.7	35.5	52.4	5.5	1.0	2.0	0.5	42.3	132.6	102.5	-	-	-	-	-	-	-	-	7.6	15.1	155.7	93.6	21.0	3.4	7.7	-	0.0
11	MEAT	3.9	17.9	85.6	12.6	2.5	1.0	3.2	3.8	0.1	6.5	488.3	-	38.6	-	147.0	-	-	36.5	-	55.6	-	-	-	-	-	-	-
12	DAIR	-	-	-	-	-	-	-	-	1.4	-	-	97.3	5.4	2.9	-	11.0	2.9	1.3	2.3	4.2	1.7	0.2	1.9	6.6	2.2	0.0	0.0
13	OFOD	7.6	43.1	189.1	26.9	6.3	2.3	42.3	0.7	1.0	1.1	51.5	41.0	1,039.7	89.2	2.3	8.9	4.7	10.1	5.0	13.0	1.8	1.0	5.0	9.2	2.3	0.3	0.3
14	BEVT	0.5	0.4	0.4	0.2	0.2	0.2	0.0	0.0	0.1	0.0	0.3	0.2	6.1	71.7	0.2	0.5	0.2	1.0	0.3	0.5	0.2	0.2	0.5	1.2	0.2	0.1	0.0
15	TCFL	1.4	1.2	6.9	0.3	2.6	3.2	1.0	0.0	0.5	0.0	1.2	0.9	4.0	2.8	90.6	7.2	1.7	13.5	0.5	2.6	0.8	2.3	4.7	10.7	6.2	0.1	0.0
16	WOOD	0.8	2.6	3.9	0.5	0.1	14.0	0.1	0.2	0.4	0.3	0.8	0.6	0.9	6.5	0.7	499.0	42.1	7.1	0.4	4.6	29.1	3.8	14.2	15.6	194.6	0.2	0.0
17	PAPR	42.2	3.7	4.2	4.0	1.6	2.5	0.1	0.8	1.4	1.4	4.4	3.5	9.4	20.0	0.9	24.9	347.7	148.2	4.3	42.4	11.0	2.6	1.6	11.1	7.0	13.6	0.2
18	PPRM	3.1	9.1	4.0	3.4	9.1	4.0	0.5	0.3	8.3	0.6	21.3	17.0	53.4	30.4	9.0	23.2	38.9	172.1	11.7	35.7	11.3	5.5	30.3	46.8	13.0	10.8	0.0
19	CHEM	107.0	422.8	733.5	62.9	70.9	73.4	2.2	2.5	35.1	4.3	33.3	25.5	29.0	7.3	6.1	141.9	81.2	12.9	1,231.1	452.5	13.9	11.1	59.8	77.0	16.9	4.9	2.8
20	RBPL	51.3	77.0	145.4	23.1	8.8	23.5	1.7	1.4	9.8	2.3	143.1	113.8	189.9	17.0	8.4	46.1	17.3	60.5	40.5	286.3	6.3	6.0	52.1	108.4	23.4	1.0	1.5
21	NMMP	2.6	8.7	13.6	1.6	1.1	1.7	0.3	5.3	29.4	9.1	0.8	0.6	6.3	48.6	0.2	4.1	0.7	2.5	0.7	4.1	354.4	8.8	32.3	145.2	7.0	0.1	3.9
22	BASM	0.8	3.3	3.3	0.4	6.1	20.1	0.1	1.4	15.3	2.4	31.2	24.8	23.5	10.5	6.2	33.4	30.6	18.2	27.5	23.3	34.8	365.7	598.9	438.2	57.2	2.2	4.3
23	FABM	14.4	45.0	65.6	8.3	9.4	26.5	6.1	3.2	17.2	5.5	43.2	34.3	73.2	171.1	11.5	42.0	35.0	15.1	34.3	55.1	33.1	210.1	931.9	842.6	57.8	16.0	1.9
24	MAEQ	9.2	31.6	59.9	5.5	53.2	11.7	52.5	2.0	95.7	3.5	11.7	9.3	20.8	17.8	6.9	9.6	10.5	15.3	20.0	12.2	6.1	28.3	54.5	645.4	7.3	70.0	1.0
25	OMFG	0.5	1.7	2.8	0.3	0.3	2.4	0.1	0.2	0.3	0.4	0.9	0.7	2.2	6.7	0.5	2.4	1.0	3.1	0.6	2.9	1.4	4.2	12.2	23.4	36.4	0.3	1.2
26	ELEC	63.0	40.3	118.0	20.3	3.6	9.3	5.2	6.8	48.6	36.1	114.8	65.9	72.1	16.0	12.0	86.2	197.7	21.0	73.5	39.6	43.8	345.3	35.9	56.2	11.1	3,349.4	30.2
27	WATS	-	-	-	-	4.3	0.1	2.4	0.2	1.2	0.3	34.6	11.3	3.6	8.8	0.8	-	0.0	-	-	-	-	-	-	1.5	-	1.5	197.1
28	WAST	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	12.7	17.1	12.3	0.1	1.0	29.6	0.1	3.0	9.8	2.0	0.1	1.1	0.2	15.1	1.2	1.0	1.3
29	CONS	20.6	67.0	99.8	12.9	5.0	26.5	6.9	61.5	233.2	105.9	2.8	2.2	3.8	6.7	3.9	14.2	16.8	2.7	2.9	5.0	47.0	3.7	21.7	219.2	4.6	473.7	0.1
30	TRDE	97.5	311.2	516.0	60.6	94.6	101.0	34.6	14.3	58.8	24.7	161.5	128.4	362.7	130.3	95.6	103.6	100.2	79.5	107.7	47.8	33.8	160.2	152.2	421.6	41.8	41.6	-
31	ACCR	2.0	3.9	4.9	1.1	2.5	2.8	0.1	0.5	2.5	0.9	1.6	1.3	2.8	1.5	1.1	1.6	0.7	2.0	1.7	2.7	1.1	0.9	3.0	7.0	1.1	1.9	0.0
32	RDFR	49.8	89.1	49.8	26.4	27.4	406.8	9.5	11.4	16.9	19.6	188.5	208.9	225.3	49.1	23.6	132.1	51.8	50.3	249.3	70.5	79.8	116.7	59.6	101.0	25.6	2.7	1.0
33	RDPS	0.4	1.1	1.0	0.5	0.6	0.5	0.2	0.1	0.1	0.1	0.7	0.5	0.8	0.3	0.1	0.4	0.2	0.3	0.6	0.4	0.5	0.2	0.3	1.2	0.1	0.4	0.0
34	RFRT	3.1	7.5	5.9	1.9	-	26.9	-	47.6	-	19.8	37.6	14.9	21.5	6.1	4.8	12.6	23.5	9.7	46.6	13.5	9.4	13.6	12.9	16.0	5.1	-	-
35	WFRT	-	-	-	-	-	6.5	2.1	4.1	59.2	29.3	41.0	-	9.8	4.4	-	9.1	25.6	-	8.5	-	24.0	9.9	2.3	2.9	-	-	1.1
36	OFRT	1.2	2.0	1.6	0.8	1.8	7.2	3.4	0.4	2.6	-	13.8	1.8	13.4	1.6	1.3	5.1	7.9	2.6	7.8	3.7	0.6	2.4	2.2	8.1	1.4	0.9	-
37	OTTR	9.9	16.5	13.0	6.1	14.1	60.3	27.5	6.8	34.9	8.4	121.3	15.4	109.1	14.4	10.7	43.0	70.0	21.4	66.6	29.9	11.5	22.5	18.4	65.4	11.2	6.8	0.3
38	COMM	34.6	63.8	46.4	31.1	17.1	27.6	5.6	3.6	12.8	6.1	28.1	22.3	40.1	15.6	9.3	24.2	16.3	41.0	31.6	38.6	16.7	13.6	34.8	91.4	11.5	24.0	0.0
39	FIIN	154.9	211.9	136.2	61.7	86.4	111.5	66.8	6.4	54.8	10.9	63.6	50.5	122.1	123.8	25.2	82.0	36.9	69.1	72.0	70.5	33.2	174.4	76.8	145.2	25.7	114.8	2.4
40	HOUS	25.6	55.3	93.5	2.4	7.9	8.4	1.2	0.7	6.3	1.2	20.0	15.9	24.6	9.0	10.8	14.7	3.7	20.2	12.0	20.5	8.1	6.4	36.0	53.5	13.6	44.0	0.0
41	EHOP	22.0	25.1	22.7	5.3	14.9	24.7	15.7	5.7	6.8	9.9	12.1	9.6	28.9	4.2	2.7	16.4	4.8	14.4	22.2	9.6	5.3	5.5	11.2	29.0	4.1	22.0	2.6
42	SRCS	32.4	58.8	43.2	7.7	36.0	39.5	14.5	6.1	174.3	10.6	80.0	63.6	64.4	64.8	8.9	22.2	78.2	35.4	79.0	45.5	31.8	48.7	72.7	213.5	11.2	596.5	2.5
43	OBUS	110.5	228.9	164.9	93.7	55.8	175.3	30.8	9.2	76.4	15.8	150.2	119.4	289.8	206.7	55.7	135.0	50.2	152.4	109.3	184.3	77.7	50.8	147.9	329.8	51.7	181.8	8.8
44	GOVC	11.2	45.0	39.7	6.0	3.6	13.1	3.4	0.8	2.1	1.3	3.5	2.8	5.9	2.3	1.7	27.8	4.4	4.0	3.1	3.8	5.3	1.6	5.9	9.8	5.4	4.4	0.1
45	GOVL	0.2	0.5	0.3	0.1	0.4	1.5	0.1	14.4	0.4	24.7	1.6	1.3	2.2	1.1	0.7	2.3	0.4	1.4	1.1	0.8	35.1	0.4	0.9	3.1	0.3	-	-
46	SCHL	1.0	2.7	3.2	0.7	0.5	1.2	0.2	0.2	0.9	0.3	0.7	0.5	1.5	0.8	0.6	4.9	0.4	6.2	0.5	1.5	0.3	0.3	3.1	3.0	0.5	5.6	0.0
47	OEDU	0.7	0.7	0.4	0.5	0.5	2.0	0.1	0.0	0.6	0.1	0.5	0.4	1.0	0.7	0.2	9.0	0.2	0.5	0.4	1.8	0.3	0.1	0.7	1.5	0.1	7.9	0.0
48	HOSP	0.1	0.2	0.3	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.0	0.1	0.3	0.0	0.1	0.0
49	OHCS	2.8	23.7	69.3	2.0	2.3	1.0	0.2	0.1	0.3	0.1	1.3	1.0	1.0	2.7	0.3	2.2	3.1	2.2	0.5	1.4	2.1	0.4	2.0	3.8	0.2	2.2	0.0
50	CULT	12.5	26.3	19.8	6.5	10.7	3.1	0.2	0.3	2.5	0.5	21.4	17.0	42.2	22.1	4.6	9.4	3.7	38.4	8.6	32.8	12.5	3.4	10.4	32.3	5.1	8.4	0.1
51	PERS	1.8	3.8	10.7	0.8	9.1	13.7	4.3	0.2	1.5	0.3	70.1	55.7	13.7	10.7	8.2	1.7	0.6	22.6	4.5	5.8	1.6	0.8	9.8	15.0	1.1	24.9	0.0
52	Household	867.2	1,228.0	1,500.9	214.1	814.5	437.0	119.6	50.6	189.2	180.8	1,222.7	494.0	956.8	334.3	400.1	684.7	357.8	774.2	217.8	641.7	453.9	419.8	1,002.2	2,195.6	340.5	452.8	72.0
Other Imports		208.2	629.6	418.9	111.6	112.9	157.4	147.3	5.1	-	23.4	325.5	317.5	1,151.0	334.3	322.5	193.9	260.2	573.5	826.5	1,106.1	206.8	274.3	804.6	1,651.7	254.8	49.8	4.5
Depreciation + Op Surplus		390.3	299.7	1,229.0	89.5	203.3	542.8	128.1	192.1	2,668.1	271.4	212.0	1,797.9	931.9	565.7	162.3	473.3	524.5	514.5	1,012.3	521.9	469.5	1,358.1	690.5	1,354.1	245.8	2,052.9	243.4
Net Indirect Taxes		56.8	234.1	243.0	34.9	9.9	22.6	-0.8	27.5	1,740.8	19.3	11.3	61.1	34.4	1,304.2	4.1	18.6	18.7	25.0	30.7	33.2	35.9	19.0	36.2	28.0	8.6	38.6	2.5
Gross Output		**2,760.2**	**6,167.3**	**7,534.0**	**1,168.9**	**2,035.7**	**3,477.4**	**885.5**	**655.9**	**9,401.3**	**1,118.5**	**8,100.1**	**10,979.4**	**7,031.3**	**3,971.2**	**1,588.0**	**3,954.3**	**2,665.7**	**3,170.7**	**4,992.4**	**3,998.5**	**2,374.6**	**4,029.9**	**5,133.7**	**9,573.6**	**1,554.3**	**8,276.6**	**587.6**

Table C.3: 2009 I-O table for the Closed Economy after the constraint (Million NZD) – Continuation (right hand side)

28 WAST	29 CONS	30 TRDE	31 ACCR	32 RDFR	33 RDPS	34 RFRT	35 WFRT	36 OFRT	37 OTTR	38 COMM	39 FIIN	40 HOUS	41 EHOP	42 SRCS	43 OBUS	44 GOVC	45 GOVL	46 SCHL	47 OEDU	48 HOSP	49 OHCS	50 CULT	51 PERS	52 Household	Final Demand	Gross Output
0.0	3.0	116.0	151.6	0.1	0.0	0.0	0.0	0.1	0.7	0.1	1.4	7.7	1.6	3.0	5.8	3.4	0.1	0.1	0.4	37.6	1.1	2.2	0.4	299.7	1,367.3	**2,760.2**
0.0	1.4	512.9	18.2	0.9	0.0	0.1	0.1	0.2	1.8	0.0	0.5	3.0	4.4	3.5	1.6	3.0	0.0	0.1	0.1	3.3	0.9	13.8	0.2	45.3	321.6	**6,167.3**
0.0	0.7	47.8	9.6	0.2	0.0	0.0	0.0	0.1	0.6	0.0	0.3	7.3	1.4	0.4	0.7	2.0	0.0	0.1	0.2	2.8	0.7	3.4	0.2	11.5	51.1	**7,534.0**
0.0	0.6	26.3	8.4	0.2	0.0	0.1	0.1	0.1	0.8	0.0	0.8	4.0	5.3	0.5	1.3	4.1	0.0	0.0	0.1	4.1	1.5	7.4	0.3	109.3	200.6	**1,168.9**
0.0	7.0	40.8	1.1	6.8	0.2	0.8	0.8	1.5	11.7	0.3	2.9	0.7	10.5	1.3	135.2	25.5	1.4	0.1	1.2	0.4	9.7	19.8	2.0	16.6	275.7	**2,035.7**
0.0	42.3	136.4	0.2	12.4	0.3	0.3	0.4	0.7	5.2	0.7	1.9	1.6	1.4	2.0	225.4	1.5	1.7	1.4	0.7	0.3	0.5	0.9	0.7	40.2	1,181.8	**3,477.4**
0.0	0.4	39.3	1.3	0.4	0.1	0.2	0.2	0.4	3.4	0.0	10.9	1.1	1.8	0.3	0.6	0.4	0.4	0.1	0.1	0.3	0.2	0.2	0.1	1.4	164.5	**885.5**
-	-	8.0	0.3	-	-	-	0.3	-	0.1	-	-	-	-	-	-	1.8	18.4	4.9	9.2	21.0	1.3	0.9	0.6	8.9	141.0	**655.9**
11.5	374.5	497.9	29.4	250.8	46.8	13.9	81.7	57.2	465.6	15.0	12.4	17.0	10.5	52.7	40.1	156.2	60.8	8.8	23.9	36.5	50.6	10.7	11.9	1,114.0	-447.4	**9,401.3**
4.8	117.0	15.7	-	8.5	0.1	6.6	-	-	0.3	0.4	0.8	1.7	0.2	1.8	1.5	-	-	-	-	-	-	-	-	3.5	268.4	**1,118.5**
-	-	13.9	468.4	-	-	-	-	0.2	1.2	-	-	-	-	-	-	11.6	-	1.0	5.9	6.4	0.3	8.0	0.3	1,568.3	5,111.4	**8,100.1**
0.0	0.1	151.9	43.8	0.3	0.0	-	-	0.0	0.2	0.0	0.5	0.6	0.1	2.1	2.4	-	0.5	0.1	0.8	0.9	0.0	-	0.0	844.8	9,788.7	**10,979.4**
0.1	2.2	188.9	382.8	0.3	0.1	0.1	0.1	0.2	1.4	0.4	4.8	0.8	2.0	1.9	5.6	3.6	0.7	0.4	2.2	49.1	3.5	16.8	0.5	1,761.8	2,995.2	**7,031.3**
0.0	0.3	39.3	455.3	0.1	0.1	0.0	0.0	0.0	0.3	0.1	1.0	0.1	0.1	0.2	4.2	0.6	0.0	0.0	0.7	0.4	0.2	14.6	0.1	1,967.5	1,400.5	**3,971.2**
0.0	45.5	170.4	0.5	0.7	0.4	0.1	0.1	0.1	0.9	0.1	0.5	40.0	0.5	1.1	7.4	13.2	1.2	2.3	4.6	2.5	1.2	6.2	0.2	295.8	825.3	**1,588.0**
0.0	1,447.2	60.9	0.3	0.2	0.0	0.1	0.1	0.2	1.8	0.2	0.4	19.6	0.1	77.6	5.9	3.0	0.4	3.2	4.4	2.1	0.3	1.4	15.1	25.3	1,441.0	**3,954.3**
0.1	38.3	161.9	5.5	3.3	1.6	0.8	0.9	1.6	12.5	0.7	5.5	68.9	0.4	24.7	208.5	1.4	0.9	1.8	3.7	2.2	9.3	0.5	0.3	218.0	1,177.9	**2,665.7**
1.6	54.9	626.5	31.5	11.6	4.0	3.1	3.3	5.8	46.3	72.4	120.9	30.8	19.6	91.1	502.9	68.0	6.9	21.4	33.8	16.0	39.0	59.6	58.8	340.0	327.9	**3,170.7**
0.7	48.2	218.1	4.0	22.8	3.8	2.6	2.8	5.0	39.5	1.1	1.9	3.4	4.4	4.6	19.6	8.9	4.4	3.5	5.3	28.9	24.9	3.8	12.3	66.7	729.2	**4,992.4**
1.7	280.5	371.8	26.1	0.5	3.4	0.4	0.4	0.7	5.8	4.7	6.1	34.0	5.0	17.2	90.9	17.9	5.8	4.2	10.2	50.6	45.4	4.8	28.3	385.5	1,130.6	**3,998.5**
2.4	1,228.1	71.8	1.8	12.1	4.2	0.1	0.1	0.2	2.0	3.1	1.4	19.6	18.6	65.8	4.4	0.9	0.5	2.9	1.9	0.2	2.6	0.2	3.1	34.3	198.1	**2,374.6**
0.7	85.5	507.1	21.9	1.0	0.5	0.2	0.2	0.4	3.2	0.6	16.3	2.3	1.2	63.7	23.2	1.8	0.9	4.9	3.1	0.8	4.0	5.0	0.6	19.2	1,477.9	**4,029.9**
3.8	506.2	486.7	46.0	2.8	1.3	2.2	2.4	4.2	33.5	8.2	19.4	126.0	10.8	36.7	17.7	37.9	13.1	6.0	10.4	6.6	1.5	5.4	1.0	86.2	848.5	**5,133.7**
3.3	534.4	395.3	30.7	24.4	19.0	19.0	20.1	35.8	285.9	157.7	10.8	24.0	43.8	59.4	91.3	153.5	80.1	25.6	79.5	71.4	9.5	55.8	16.7	578.3	5,476.9	**9,573.6**
0.1	80.7	43.3	15.6	0.2	0.3	0.0	0.0	0.1	0.7	0.3	0.9	49.0	2.3	1.5	2.8	3.1	3.7	2.2	1.7	0.9	1.0	1.7	4.2	333.9	894.5	**1,554.3**
2.3	53.4	393.6	141.6	6.0	2.9	8.9	0.5	6.1	48.0	45.3	34.4	4.4	8.4	58.6	75.9	83.4	98.7	31.1	97.1	36.6	47.6	49.1	15.7	1,669.5	335.5	**8,276.6**
0.1	2.6	39.0	2.6	0.0	0.0	0.1	0.2	0.3	2.2	-	0.0	197.6	-	0.3	0.0	2.4	48.2	0.0	0.0	1.3	1.9	0.0	-	1.0	19.9	**587.6**
214.4	54.3	3.5	0.7	0.7	0.1	0.1	0.1	0.1	1.0	0.5	21.7	2.7	0.3	0.4	10.3	53.4	113.3	6.3	3.8	20.5	39.1	0.4	50.1	7.9	2.2	**715.8**
11.5	6,690.0	87.5	2.7	12.7	8.5	3.8	4.0	7.2	57.0	93.1	68.2	1,383.4	10.4	36.6	30.2	520.1	978.8	29.7	175.3	44.1	117.9	121.3	67.2	140.1	17,841.3	**30,013.1**
16.0	941.6	2,151.2	405.1	331.7	94.1	13.5	15.9	26.6	211.9	122.8	143.9	265.7	93.7	105.6	423.1	227.5	48.7	53.4	68.3	182.3	104.6	51.0	4.6	12,711.5	14,327.8	**36,624.1**
0.4	24.8	66.4	11.4	4.1	0.8	3.3	3.5	6.3	50.3	2.4	14.3	2.9	3.0	18.2	28.6	168.3	10.5	30.7	47.9	28.8	75.5	24.3	16.0	2,932.5	2,167.2	**5,795.6**
5.6	81.8	1,002.8	2.2	1,261.5	6.6	8.2	8.7	15.5	123.3	43.6	16.3	2.3	21.1	19.9	82.3	35.1	17.7	3.3	7.7	3.5	11.1	23.1	26.2	120.9	147.1	**5,439.7**
0.1	5.4	9.0	3.0	12.6	10.4	0.7	0.8	1.4	10.9	0.8	9.9	0.2	2.4	22.0	27.0	15.6	0.6	17.3	18.8	5.6	19.2	14.8	13.6	239.3	358.8	**831.9**
-	3.8	22.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	115.3	18.3	**520.5**
1.9	2.8	-	11.9	106.7	18.4	62.6	-	1.2	12.6	20.3	5.4	-	-	-	-	-	-	-	-	-	-	-	-	53.6	34.4	**571.7**
-	4.1	98.0	-	12.3	-	2.9	4.6	23.8	187.3	8.8	9.0	0.9	5.2	17.6	33.6	20.2	2.3	0.6	3.9	1.2	2.3	7.2	3.2	82.8	422.9	**1,050.3**
0.5	33.2	774.6	2.9	123.5	4.5	38.3	36.0	188.0	1,481.7	74.2	72.5	7.2	41.3	139.2	265.2	159.2	17.8	4.6	30.6	9.9	17.8	56.6	25.5	669.0	3,294.1	**8,403.2**
5.0	180.3	717.9	36.0	223.4	17.8	6.8	7.2	12.8	102.0	1,352.9	270.8	26.4	32.8	228.1	402.0	257.9	79.4	15.7	92.5	44.2	85.3	138.5	68.2	1,599.4	898.3	**7,609.1**
7.0	239.9	2,087.6	134.0	137.0	41.6	34.6	36.7	65.4	521.3	138.2	5,532.2	908.8	240.2	374.1	944.6	566.0	122.9	25.6	133.6	118.0	281.9	318.6	257.1	2,334.3	863.1	**18,654.1**
2.2	101.1	895.2	59.7	42.5	6.8	5.3	5.6	10.0	79.6	47.0	183.4	915.1	35.1	109.3	261.0	291.6	14.7	6.5	32.7	15.8	128.5	144.0	47.4	13,305.8	1,982.4	**19,244.0**
4.6	36.4	145.8	10.8	56.8	21.8	34.6	36.7	65.4	521.5	15.9	56.8	22.7	161.0	85.0	118.4	97.2	82.1	2.2	27.3	25.9	38.5	44.4	29.0	106.1	533.2	**2,737.2**
2.3	275.1	775.3	35.8	7.5	9.3	7.3	7.7	13.7	109.4	128.5	714.3	12.6	42.2	1,389.0	559.6	457.3	263.9	8.9	24.3	83.6	114.8	193.0	68.5	114.1	2,495.6	**9,855.4**
13.1	720.1	3,337.2	255.9	121.4	44.2	24.7	26.2	46.6	371.9	462.9	1,111.8	227.1	215.3	770.1	2,416.4	1,005.9	257.0	86.9	274.5	225.6	438.1	605.1	442.6	378.8	1,315.8	**18,457.9**
1.4	34.7	132.9	11.3	15.9	2.7	1.2	1.3	2.3	18.6	9.0	73.6	29.2	8.3	31.1	50.8	99.7	6.8	22.3	7.9	23.4	46.2	20.4	17.3	174.2	11,108.1	**12,168.9**
10.4	8.3	9.9	0.5	9.5	0.2	0.2	0.2	0.3	2.7	1.4	10.0	5.1	2.8	15.0	63.6	15.7	98.2	40.2	5.3	6.9	11.9	196.3	10.7	135.9	4,589.1	**5,345.5**
0.1	4.6	17.2	1.7	1.2	0.6	0.5	0.5	1.0	7.6	4.0	5.1	4.1	1.5	7.9	15.0	20.5	5.9	11.5	21.5	7.1	6.2	14.1	12.5	108.7	4,046.5	**4,368.4**
0.0	9.7	13.5	1.0	0.7	0.5	0.3	0.3	0.5	4.1	7.1	6.8	2.4	2.0	18.7	63.3	40.5	1.4	8.5	60.2	6.0	23.9	3.5	35.1	877.0	3,092.0	**4,309.9**
0.0	0.5	2.8	0.2	1.0	0.0	0.1	0.1	0.1	0.8	0.4	0.8	0.1	0.2	4.8	2.4	16.7	0.1	0.1	1.1	2.0	6.4	0.4	0.8	430.2	6,323.4	**6,798.1**
0.1	5.2	22.0	1.0	2.7	0.9	0.7	0.7	1.2	9.9	1.5	17.1	4.3	4.6	15.7	21.3	85.5	19.6	9.6	11.3	177.0	689.8	34.6	5.6	1,953.4	4,326.3	**7,549.7**
0.6	22.4	391.4	29.1	6.2	2.2	2.8	3.0	5.3	42.5	113.1	54.4	12.4	21.0	41.7	732.4	55.2	90.9	41.8	22.4	5.4	20.2	806.6	40.8	3,014.0	1,264.3	**7,196.9**
0.2	40.2	97.6	5.0	27.1	1.6	0.6	0.6	1.1	8.7	7.5	26.4	60.5	4.7	30.6	181.0	63.5	151.9	21.2	26.9	57.5	54.0	61.3	227.0	2,032.6	254.4	**3,736.7**
167.9	4,847.2	9,291.7	1,516.9	1,040.8	288.3	120.8	100.6	207.2	1,675.5	1,068.8	3,463.6	517.8	311.3	3,635.8	4,991.8	5,951.2	1,553.9	3,346.4	2,416.0	4,404.4	2,845.3	1,420.6	1,290.6	-	-	**73,097.4**
5.1	6,330.5	2,363.9	280.1	123.6	73.5	41.0	52.0	82.1	658.4	364.7	179.4	303.0	226.9	413.4	1,063.4	498.3	96.5	130.0	190.6	570.6	408.1	626.6	255.2	10,949.6	-	**36,758.4**
203.6	4,005.6	6,283.4	945.1	818.3	188.7	70.1	103.8	130.7	1,052.6	3,139.4	5,034.4	11,665.3	1,019.3	1,702.1	4,127.2	683.8	930.0	298.9	269.6	339.0	1,686.8	1,686.8	507.9	-	-	**66,037.8**
8.8	354.3	441.4	132.7	571.7	-101.7	-24.1	-	13.4	104.2	68.6	1,295.5	2,196.8	75.9	51.2	68.2	154.1	31.6	19.7	34.6	6.8	17.4	290.9	40.3	6,663.5	-	**16,614.3**
715.8	**30,013.1**	**36,624.1**	**5,795.6**	**5,439.7**	**831.9**	**520.5**	**571.7**	**1,050.3**	**8,403.2**	**7,609.1**	**18,654.1**	**19,244.0**	**2,737.2**	**9,855.4**	**18,457.9**	**12,168.9**	**5,345.5**	**4,368.4**	**4,309.9**	**6,798.1**	**7,549.7**	**7,196.9**	**3,736.7**	**73,097.4**	**119,410.5**	**527,692.3**